WIRE AND WIRE PRODUCTS

JUNE 1954

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WM84

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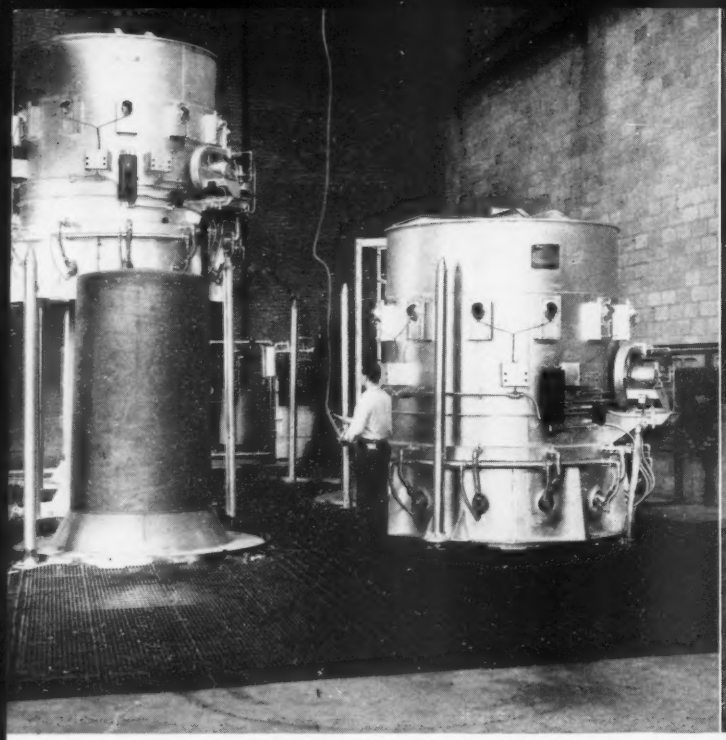


Part of the Lee Wilson Annealing Installation at the Lamson & Sessions Co., Cleveland Bolt Plant.

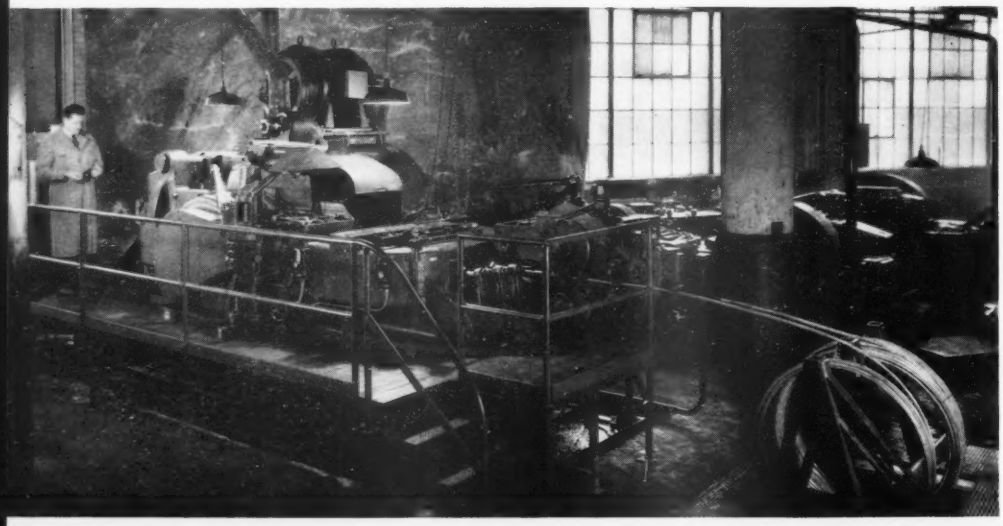
High Speed Cold Heading Bolts Requires Controlled Rod Spheroidizing

The automatic screw and bolt machines that cold forge thousands of pieces every hour are necessarily expensive and complicated. Wire or rod is fed from a coil directly into the machine and, operating faster than the eye can follow, the machine cuts the material to length, cold heads it, points and threads it with exacting precision.

It is important that the wire or rod be uniformly spheroidized prior to entering the machine. By altering the structure of the steel so the carbides are held in spheroidal grains, forcing the metal into shape is accomplished with far greater ease than if the grain structure retains the "needle-like" shape after hot rolling.

The ability of the Lee Wilson wire and rod annealing furna to produce a constantly uniform spheroidized anneal at minim cost is the big reason why today more wire and rod are proces in Lee Wilson furnaces than in any other type.

The Lee Wilson installation pictured on this page is that of The Lamson & Sessions Co., one of the world's leading producers of cold forged fasteners.



(Above) Six steps in cold forging bolt performed by the Automatic Bolt Machine.

◀ (Left) Automatic Bolt Machines c into finished bolts.

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FIRTHALOY Sintered Carbide is the standard of quality for drawing and forming operations. It assures maximum production, uniform size, excellent finish and economical operation. To do work better, faster, and cheaper . . . specify **FIRTHALOY** Sintered Carbide when ordering from your local tool and die maker.

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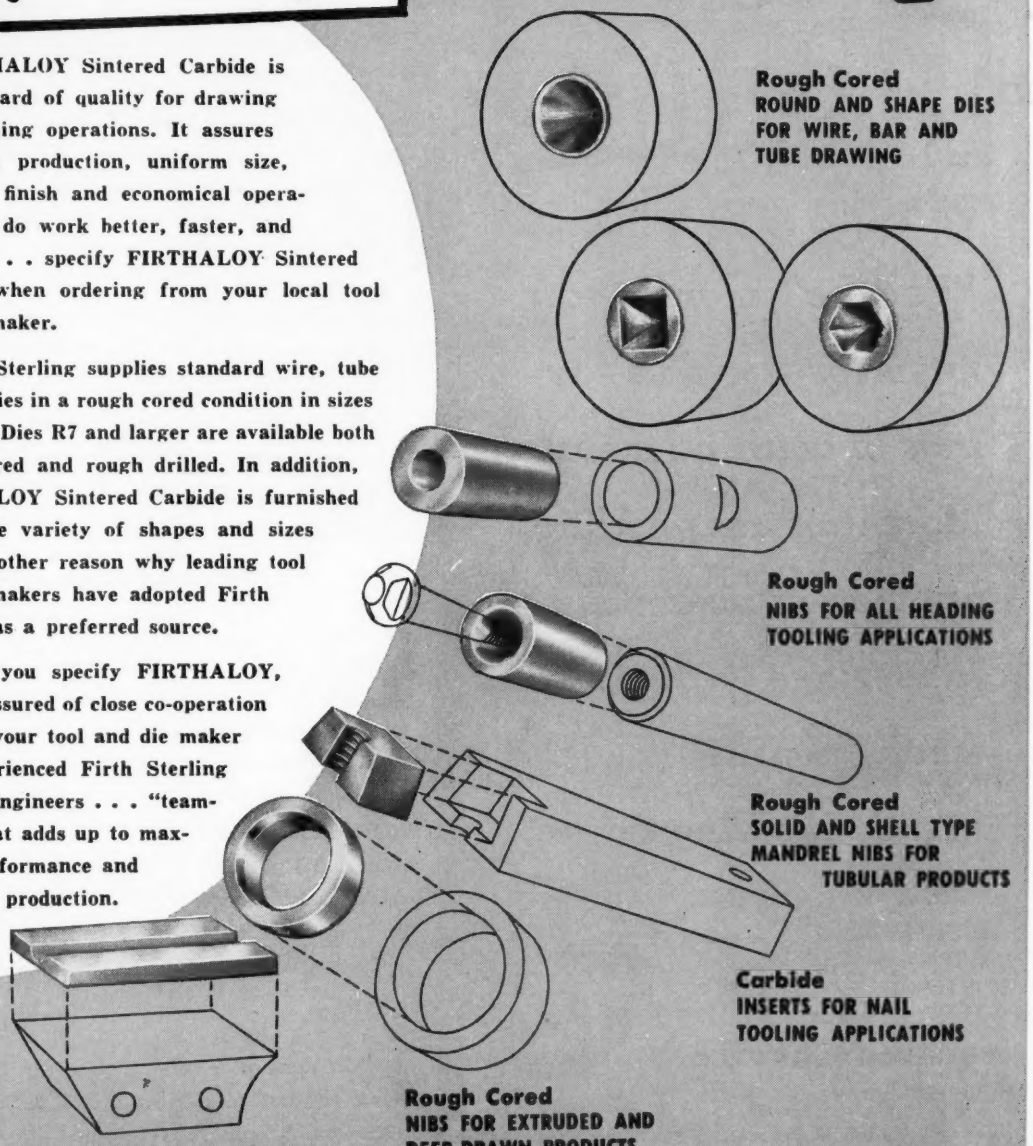

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TESTS DEMONSTRATE EFFECTIVENESS OF...

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RODINE

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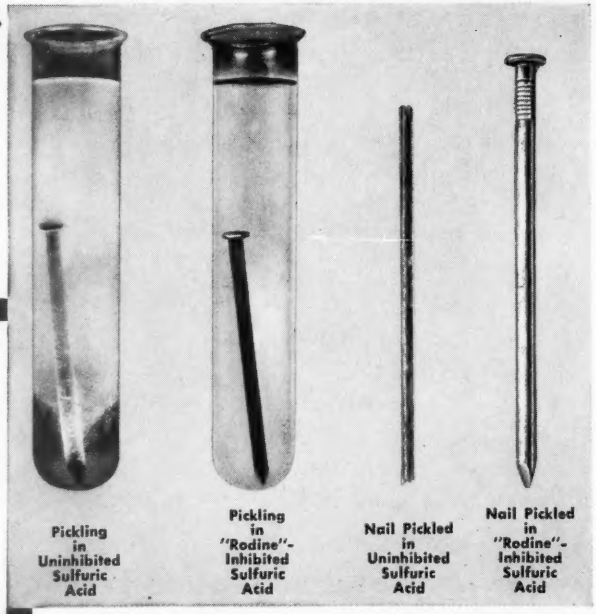
PICKLING ACID INHIBITOR

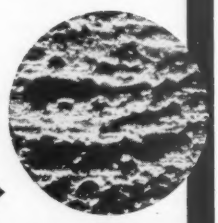
"Rodine" more than pays for itself in savings of acid and metal. More uniform pickling and better pickled surfaces are obtained when "Rodine" is used in acid pickling baths.


Pickling in Uninhibited Sulfuric Acid
Pickling in "Rodine"-Inhibited Sulfuric Acid
Nail Pickled in Uninhibited Sulfuric Acid
Nail Pickled in "Rodine"-Inhibited Sulfuric Acid

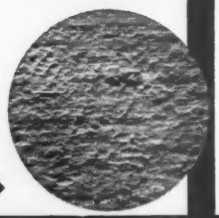
The photographs above illustrate the beneficial effect produced by a small amount of "Rodine" in a pickle bath.

A. Both test tubes contain a 10 per cent by volume solution of sulfuric acid. In the left-hand tube, no further additions have been made to the acid. Notice the gas bubbling off the nail. This is hydrogen, caused by the action of acid on good metal. In the right-hand tube, "Rodine" has been added in an amount equal to 1 per cent by volume of the concentrated acid. Notice the absence of bubbling in this tube. "Rodine" prevents the formation of hydrogen that results from dissolving metal.

B. Both nails after being pickled for the same time. The nail pickled with "Rodine" has lost little weight and has retained its original luster and appearance. The nail pickled without "Rodine" is no longer a nail. "Rodine" prevents the acid from dissolving metal.



This steel surface was pickled in an uninhibited acid bath. Note the deep pits, and that the surface is visibly crystalline.



This surface was pickled exactly like the one above except that "RODINE" was added to the acid solution. Only scale pockets and roll marks are visible; no pitting occurred.

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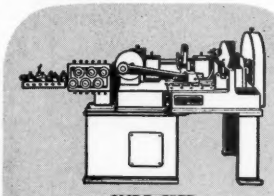
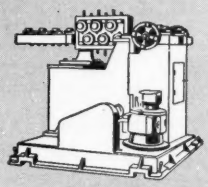


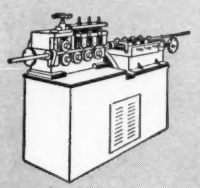
SLIDE FEED STRAIGHTENERS

3/8" x 10"; 9/16" x 10"



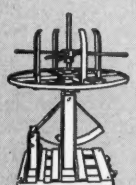
FEED STARTER AND STRAIGHTENER

Max. 5/8" dia.



TUBE AND BAR STRAIGHTENER

7/32" to 5/8" bar 1" tubing



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WIRE AND WIRE PRODUCTS*

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 29 JUNE, 1954 No. 6

Designated as Official Publication By The Wire Association

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4 STEP
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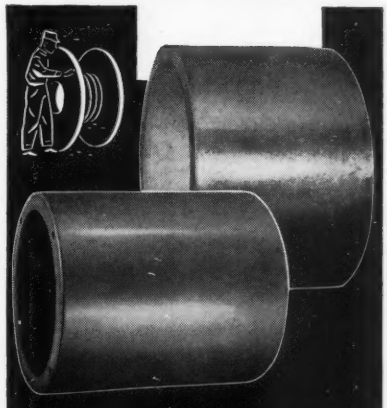
For Wire and Cable Reels



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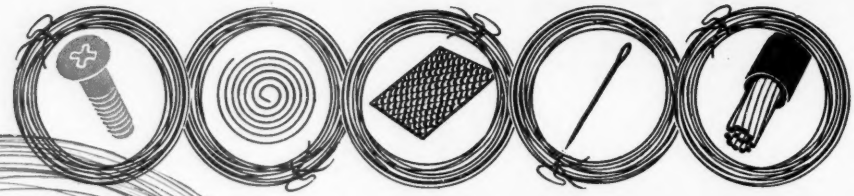

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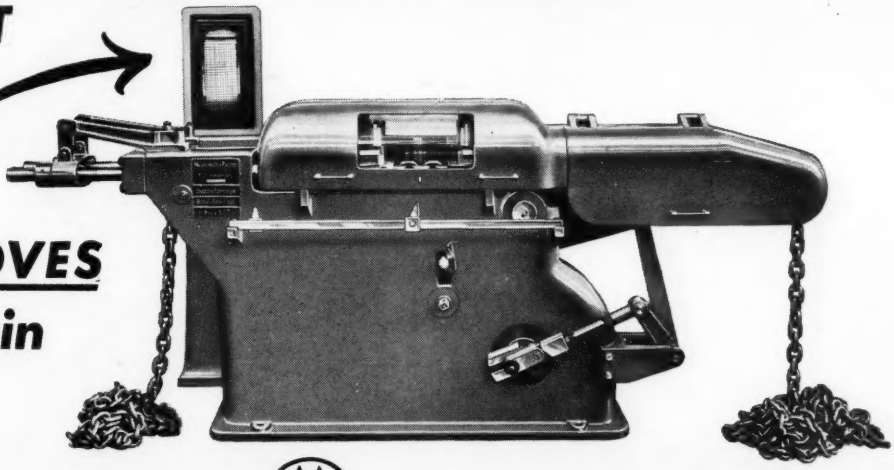
WHOEVER BUYS THIS CHAIN

CAN GET *this* CHART which **PROVES** the chain is good



it was tested on a M R+P automatic tester

Meyer, Roth & Pastor chain testers do a more complete and accurate job than ever before. Depending on pitch and wire diameter, lengths of chain from 3 to 13 links can be tested at a time, and up to 45 lengths can be tested in one minute, automatically. Furthermore, for each length which meets tolerances, a continuous-line chart is produced which you can deliver with the chain as proof of thorough testing.

Here's how it works: each section of chain is stretched to a pre-determined length. The chart shows the tensile strain used to stretch each section. Those which stretch to the limit before minimum strain is applied are too weak—those which require strain over maximum have short links which weaken during testing. Both types, including those which break during tests, are rejected, and the machine stops automatically. However, sections which reach full length between mini and maxi strains are passed, and each one has the chart to prove it.

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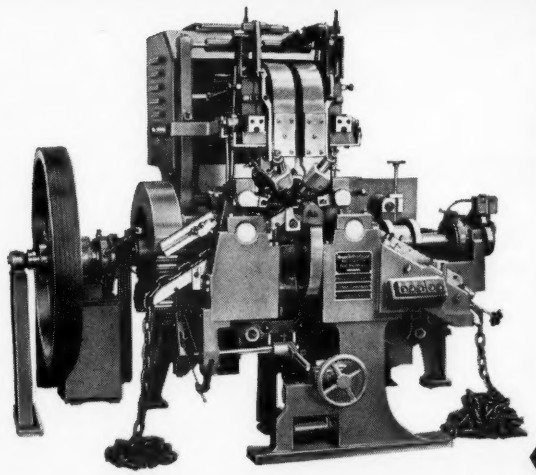

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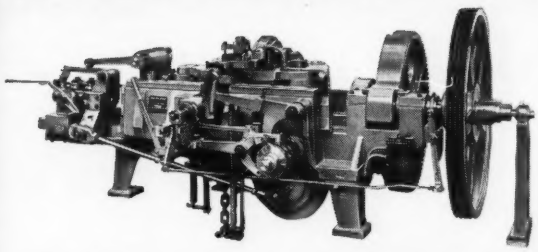

Excellent for short or long links. Two-position bending (for wire diameters of 3/8" or more) prolongs tool life and reduces bending marks on links. 7 sturdy models. Capacities: wire stocks up to 1" dia. Speeds: up to 130 links/min.

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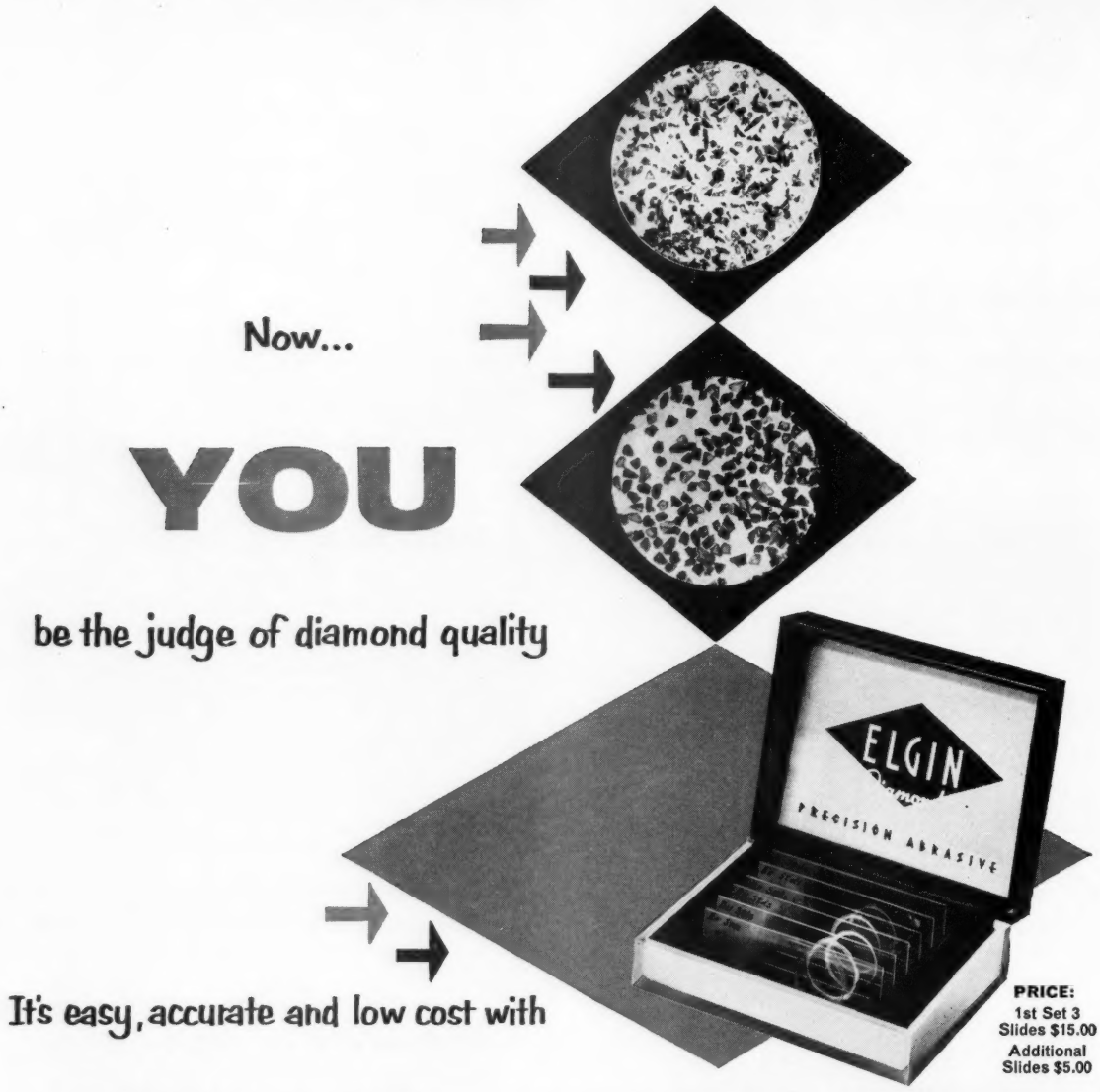

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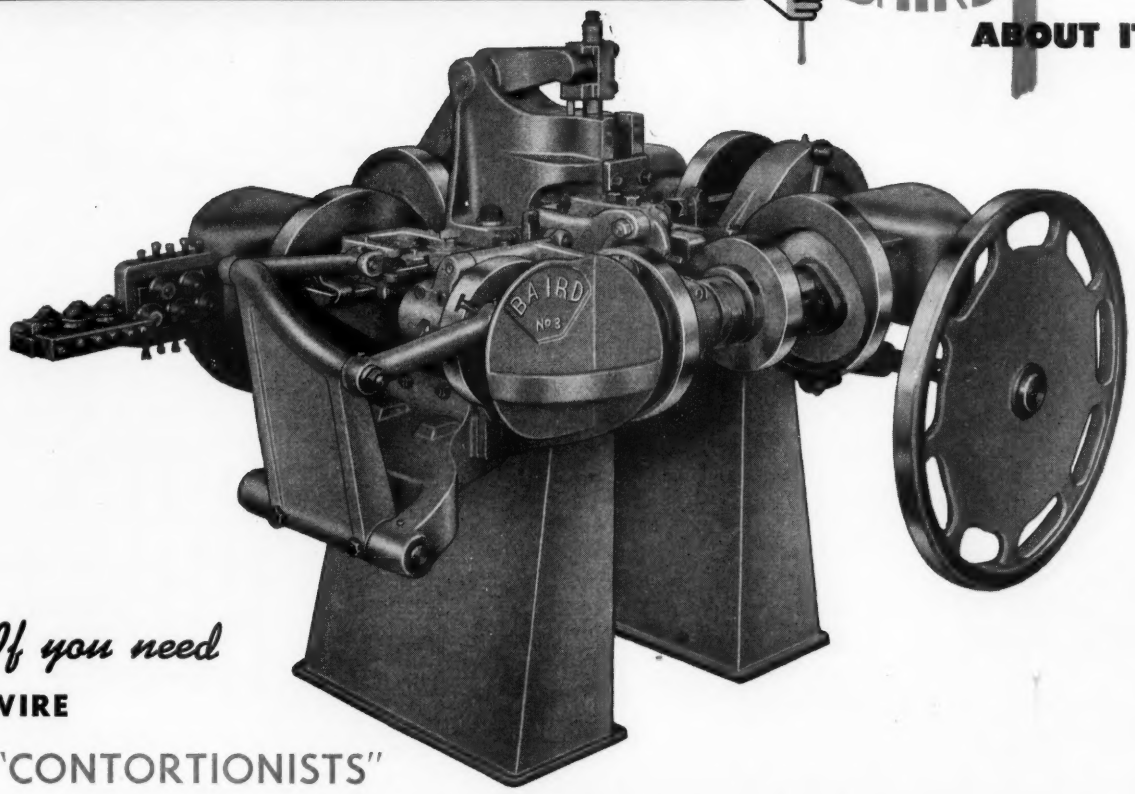

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Thus you may purchase your machines for specific repetitive production, then, at any time, add special attachments as your production requirements indicate. At all times you may count on Baird engineers for development of tooling from your parts or specifications.

This is your profit-making machine. Send for the Baird Four-Slide Bulletin.

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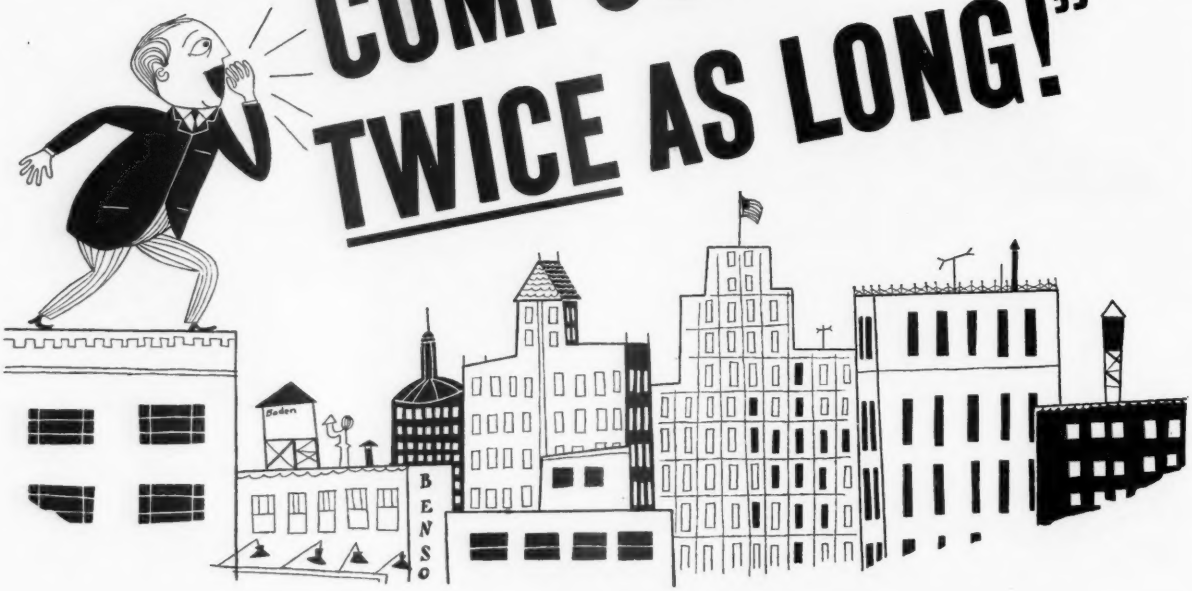

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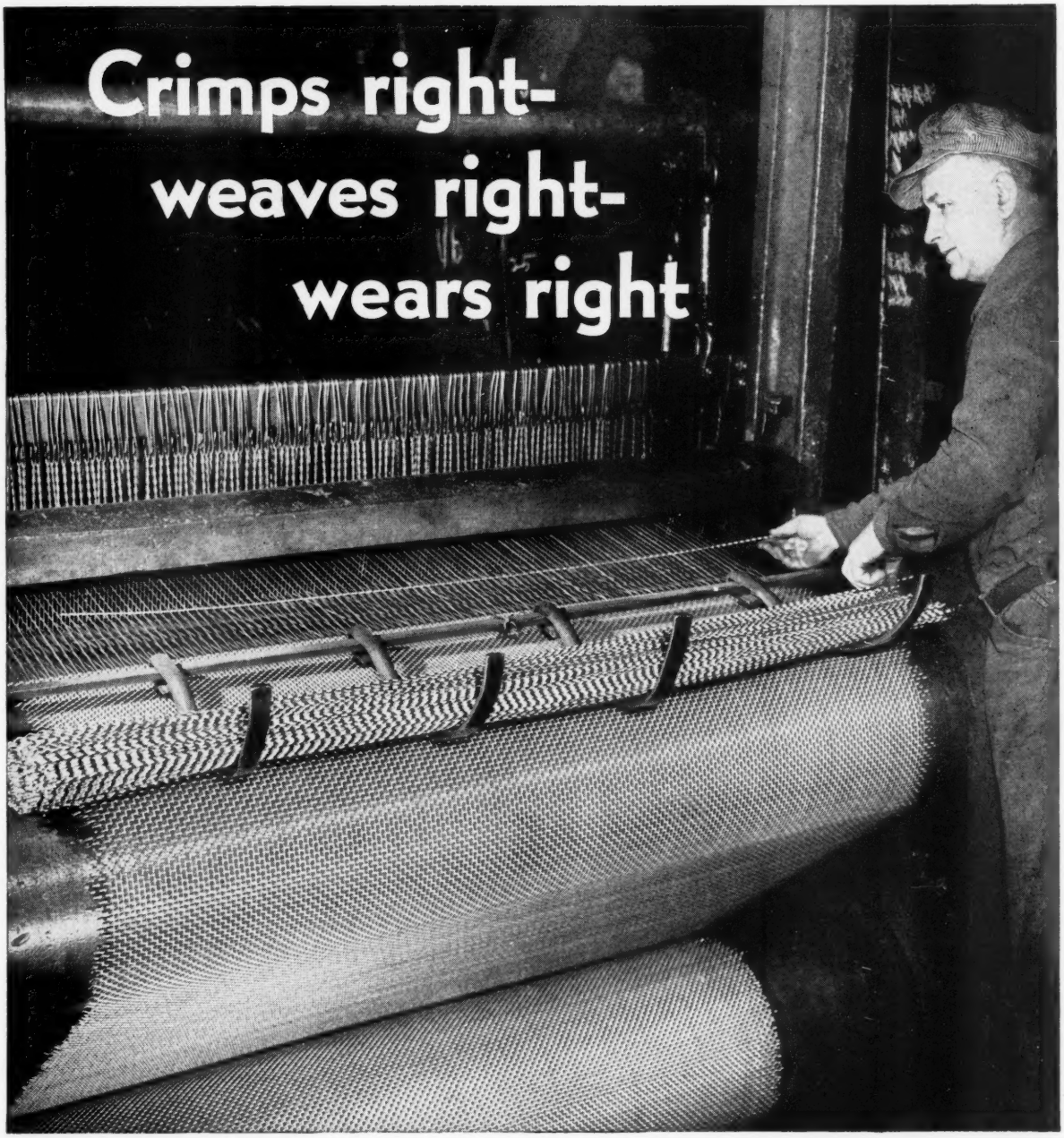

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● To be woven into top-grade industrial screening, wire must be ductile enough to crimp uniformly, yet hard enough to give years of wear. That's why so many men who know rely on Youngstown Hard Drawn or Annealed wire for the right kind of weaving job. For further information, phone or write our nearest District Sales Office.

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as much as 1/3

Also a New 150 Yarn

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1 Inventory reduction

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2 Control of spread and build

New medium twist permits more flexibility and better control of spread and build... *more miles per dollar!*

3 Smooth, uniform wire—minimum fuzzing

Tests show that this medium twist yarn reduces fuzzing to a minimum, resulting in a smooth finish.

THE SECRET IS UNIFORMITY

The advantages offered by this new medium twist 300 yarn are directly attributable to uniformity: uniformity of the yarn itself, and uniformity both in size and quality of the package. And for that the credit must go to the Electronic-Extrusion process, which produces glass filaments of consistently uniform diameter. *No other maker of glass fibers uses this process.*

For information and samples, write to Glass Fibers Inc., 1810 Madison Avenue, Toledo 2, Ohio.

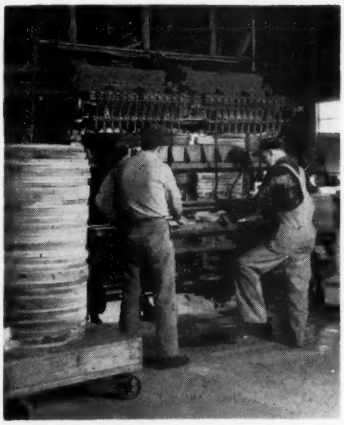
GLASS FIBERS *INC.*

Makers of glass fibers by the ELECTRONIC-EXTRUSION process ... developed, patented and used exclusively by Glass Fibers Inc.

VITRON Yarns • Rovings • Micro-Fibers • **DURAMAT** Vapor Barriers
BLUE FLAG Pipe Wrap • **MICROLITE** Thermal and Acoustical Insulation • **VIBRAGLASS** Mounting and Packaging Materials
COUSTIC-AIRE and **THERMO-JET** Aircraft Insulations

REELS
for
SHIPPING · HANDLING · PROCESSING

FOR ALL TYPES OF WIRE AND CABLE

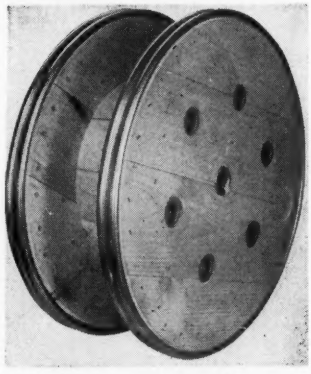


Nailing Operation

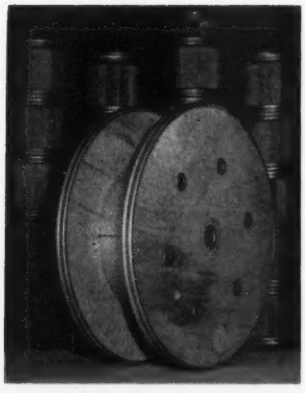
NAILED FLANGES—ALL SIZES. Flanges only or assembled as complete reel with stave or steel hub. Produced in our own completely equipped plant.

HUBBARD'S DIE FORMED STEEL TIRE. Adds life to reels, eliminates maintenance costs. Applied to nailed, dimension lumber or plywood flanges. Flanges only or assembled with stave, steel or aluminum hubs.

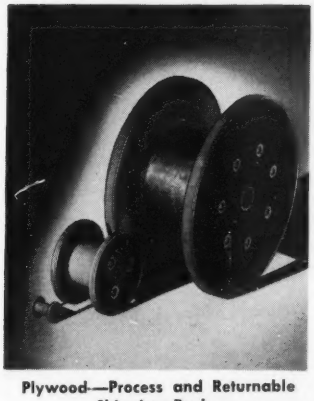
Banding Operation



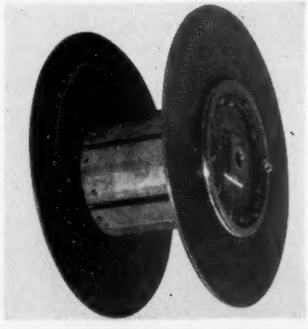
Nailed Reel. Banded for Returnable Types.



Dimension Lumber for Returnable Reels.

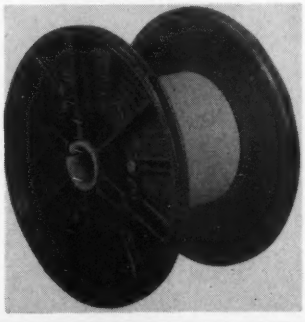


Plywood—Process and Returnable Shipping Reels.



Left: Special Reels Made to Your Designs

The HUBBARD line includes all types of spools and reels required for any shipping, shop or processing need.



Right: Light Alloy Cast Reels for Process & Shipping

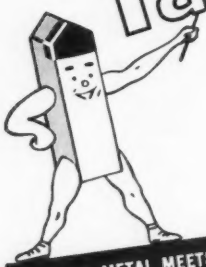
HUBBARD SPOOL COMPANY

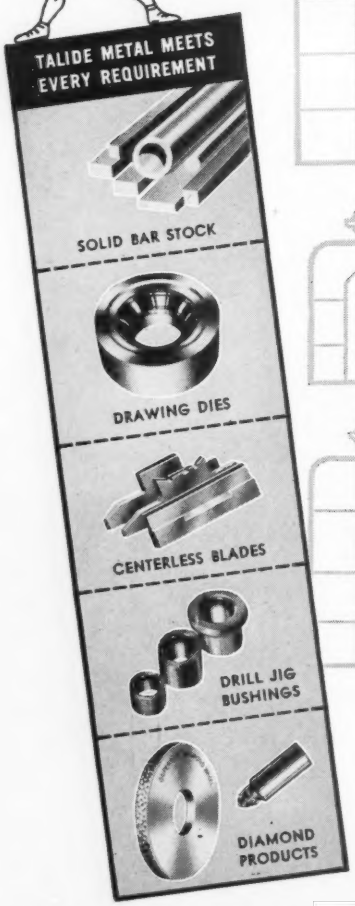
GARRETT • INDIANA

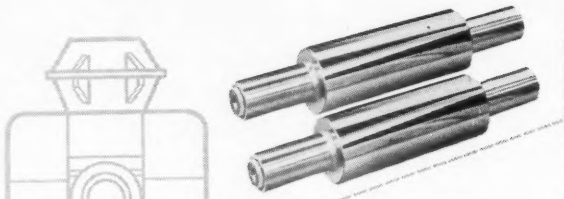
Telephone: 840

"THE BIGGEST NAME IN SPOOLS AND REELS"

Talide ROLLS double production of your mill



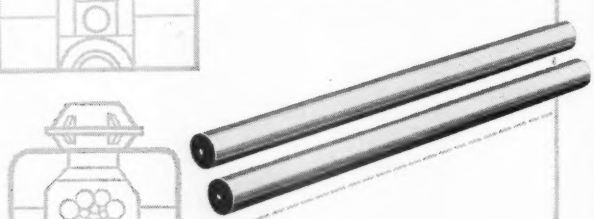




Solid Carbide Rolls for 4-High and Cluster-Type Mills.

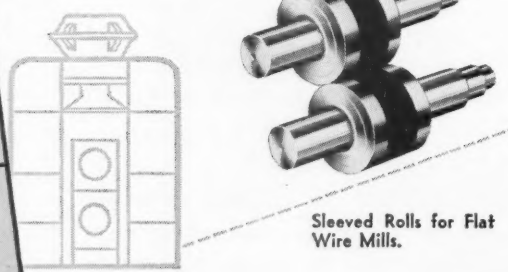
1600 to 20 coils

LARGE PITTSBURGH STRIP STEEL PRODUCER reports rolling 1600 coils of low carbon, high carbon, stainless and alloy steel strip with Talide rolls before same needed regrinding. Best previous service life obtained with steel rolls averaged between 16 and 20 coils.



168 to 7 hours

LEADING OHIO STRIP STEEL PRODUCER averages 750 coils of various types and analysis between grinds, enabling them to operate their cold rolling mill continuously without roll changes for 7 days, 3 turns per day. Previous steel rolls used averaged 6-8 hours, necessitating 3 or 4 roll changes per day with considerable down-time.



Sleeved Rolls for Flat Wire Mills.

50 to 2 coils

LARGE STEEL PRODUCER of straight chrome and nickel-chrome stainless steel strip now operates continuously for 3 turns or more with Talide rolls, whereas with steel rolls it was necessary to change 7 or 8 pair per turn. 50 coils are now rolled per regrind compared to 2 coils with steel rolls.

METAL CARBIDES CORPORATION

TALIDE

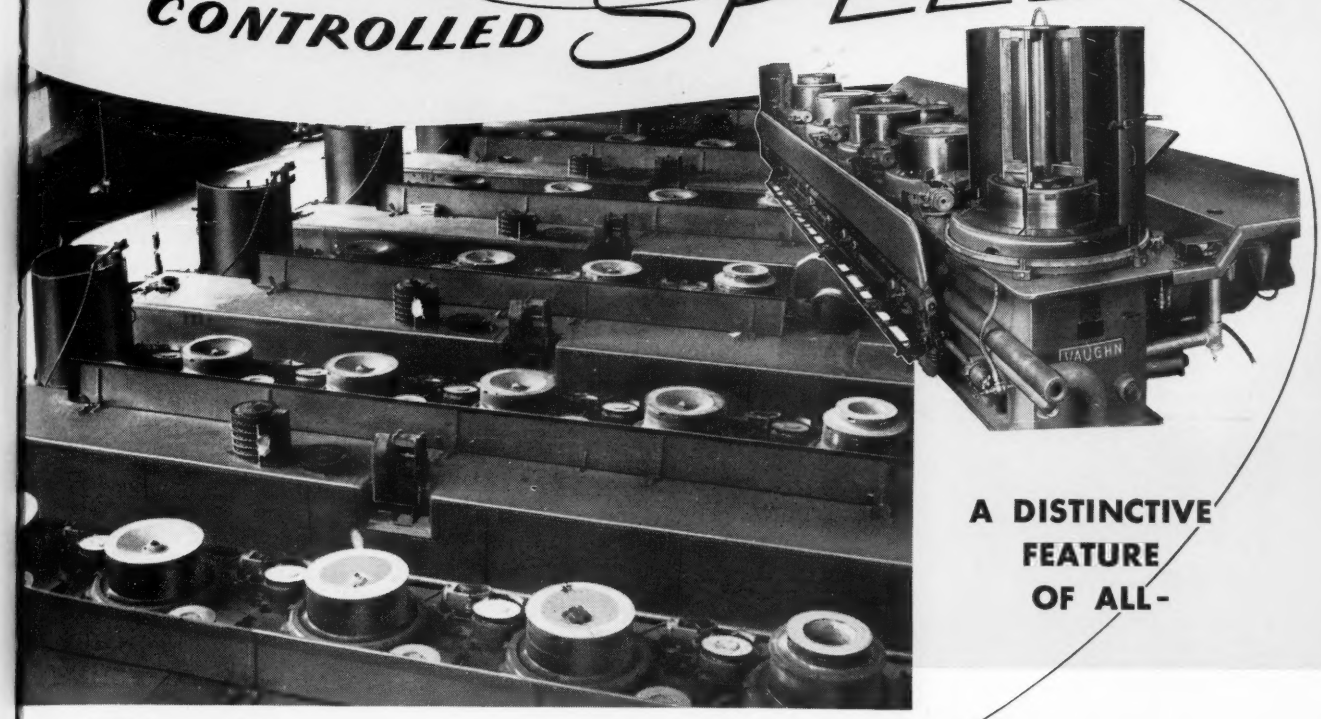
YOUNGSTOWN 7, OHIO

SINTERED CARBIDES · HOT PRESSED CARBIDES
HEAVY METAL · CERMETS · HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

Send for New 84-Page Catalog 54-G or Ask for Sales Engineer to Call.

Metal Carbides Corp., Youngstown 7, Ohio

CONTROLLED SPEED—



A DISTINCTIVE FEATURE OF ALL-

Vaughn® MOTOBLOX®

The speed of each block is AUTOMATICALLY controlled to meet the preset speed of the finishing block—thereby eliminating SLIP and accumulation of wire on intermediate blocks.

The Vaughn MOTOBLOX is a truly non-slip machine – check the facts with a Vaughn engineer!

"Quick on the Draw!"

THE VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

To Make Auto Hood Hinge Springs, straight wire goes in one end (note wire extreme right), a coil spring comes out the other on this high-speed coiler at the Chelsea Spring Division of Rockwell Spring & Axle Co. at Chelsea, Michigan. Here's . . .

How Pittsburgh Steel Helps Chelsea Spring Division Produce High-Quality Springs By The Millions

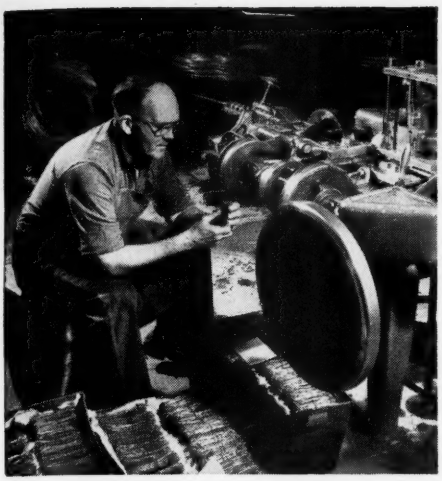
Intricate Springs, like these automobile trunk latch springs, are less than one inch long yet contain 7 inches of .025-inch diameter music spring wire. They are produced at the rate of about one each second from a No. 1 Sleeper-Hartley torsion coiler at Rockwell's Chelsea Spring Division.

Mass-producing intricate steel springs of many sizes and types, each for a specific function, is a complex job. Here's how Chelsea Spring Division of Rockwell Spring & Axle Co., one of the country's largest spring makers, turns out high quality steel springs by the millions for automotive, appliance, aircraft, and many other industries.

First, Chelsea has experienced engineers and production men who know how to design and produce springs to meet customers' exacting specifications. Second, Chelsea has the finest, latest model, high speed automatic machines to do the actual forming, shaping, producing. Third, Chelsea uses only the finest quality steel wire like that produced by Pittsburgh Steel Company. So, the secret of Chelsea's success is a combination of expertly trained production men, the best machines, and the finest raw materials.

Pittsburgh Steel Company, one of the country's leading producers of high quality steel wire, supplies Chelsea with a wide range of wire products—the kind that can be depended on to meet the requirements of high speed production. The steel has to meet specifications exactly and it must be absolutely uniform from coil end to coil end, and from coil to coil. The slightest variation from absolute uniformity in the wire can cause jamming in the machines, production delays, and costly rejections.

Pittsburgh Steel Company has been a wire producer for over 50



To Keep Auto Upholstery Smooth thousands of wires are formed hourly at Chelsea Spring Division on a Baird No. 2, four slide machine from .047-in. dia. drawn MB spring wire. Finished wires must conform to a tolerance of plus-or-minus .010 on length and form.

Chrome Trim and Ornaments on Your Car are held tightly in place by Rockwell-produced spring clasps like these made from high quality, cold rolled annealed and spheroidized steel strip from Pittsburgh Steel's Thomas Strip Division, Warren, Ohio.

Springs for Your Riding Comfort—These automobile seat springs are shown here emerging from zig-zag forming machines (background) at Rockwell's Falls Spring Division, Detroit. After heat treating and tempering the springs are ready for assembling to auto seat frames.

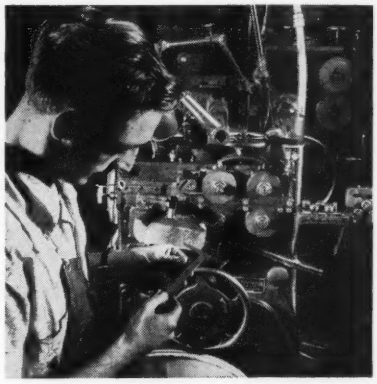
years. The long experience of its mill men and metallurgists at steel-making from the blast furnaces and open hearths through the final wire drawing and finishing operations, goes into every pound of wire that is made.

On Pittsburgh Steel wire mills at Monessen, Pa., some of the most modern in the industry, are produced such grades as bright basic wire; low, medium and high carbon; all types of annealed wire; ACRS core wire; cold-heading wire; oil-tempered spring wire; and shaped wire.

The wire mills of the subsidiary Johnson Steel & Wire Company at Worcester, Mass., producers of fine wire specialties, have just completed a thoroughgoing modernization. Its range includes aircraft cord wire, armature binding wire, wire for brushes, metal stitching, hose reinforcement, stapling wire, bobby pin wire, tire bead wire, rope wire, oil tempered and MB hard drawn spring wire, and music spring wire right down to sizes as fine as a human hair.

The Thomas Strip Division, Warren, Ohio produces a line of cold-rolled strip steel electrolytically pre-coated with zinc, copper, brass, nickel, lead alloy; hot dip tin and lead-alloy—also annealed spring steel like that shown in photo (second from right, above).

The combined operations of these plants offer the spring maker an unusually broad diversity of high quality steels to select from, assure him fast service to meet a wide variety of applications. Pittsburgh Steel's operations are geared to mesh smoothly with the customers' production line requirements. Oil tempered spring wire, for example, is stocked at Monessen for immediate shipment. If, like Chelsea, you use steel wire in your manufacturing operations, why not talk to a man from Pittsburgh Steel? You will find him at one of the company's district offices near you, or at the home office. A phone call or a letter will bring prompt action. He will be glad to show how you can get the full benefits of Pittsburgh Steel's ability to make the kind of wire you want and deliver it when, how, and where you want it.



A Small Spring can often be vital to the operation of a large unit in today's automobile. These relief valve springs for automatic transmissions are a good example. When compressed to 1.625 inches, the spring must develop a force of 4 pounds with a tolerance of plus-or-minus .02 pounds. Each of these springs made at the Chelsea Spring Division of Rockwell Spring and Axle Company, Chelsea, Mich. must be tested to assure perfect operation.

"Everything New But The Name"

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES: Atlanta • Chicago • Cleveland Columbus • Dallas • Dayton • Detroit • Houston • Los Angeles New York • Philadelphia • Pittsburgh • San Francisco • Tulsa Warren, Ohio. **PLANTS:** Monessen, Pa. • Allenport, Pa. • Akron Los Angeles • Unionville, Conn. • Warren, Ohio • Worcester, Mass.

PRINCIPAL PRODUCTS: Hot and Cold Rolled Strip and Sheets • Strip Specialties • Seamless Tubular • Wire and Wire Products Chain-Link Fence • Cargotainers • Steeltex

Here's the World's BEST Insurance for Insulated Wire Manufacturers!

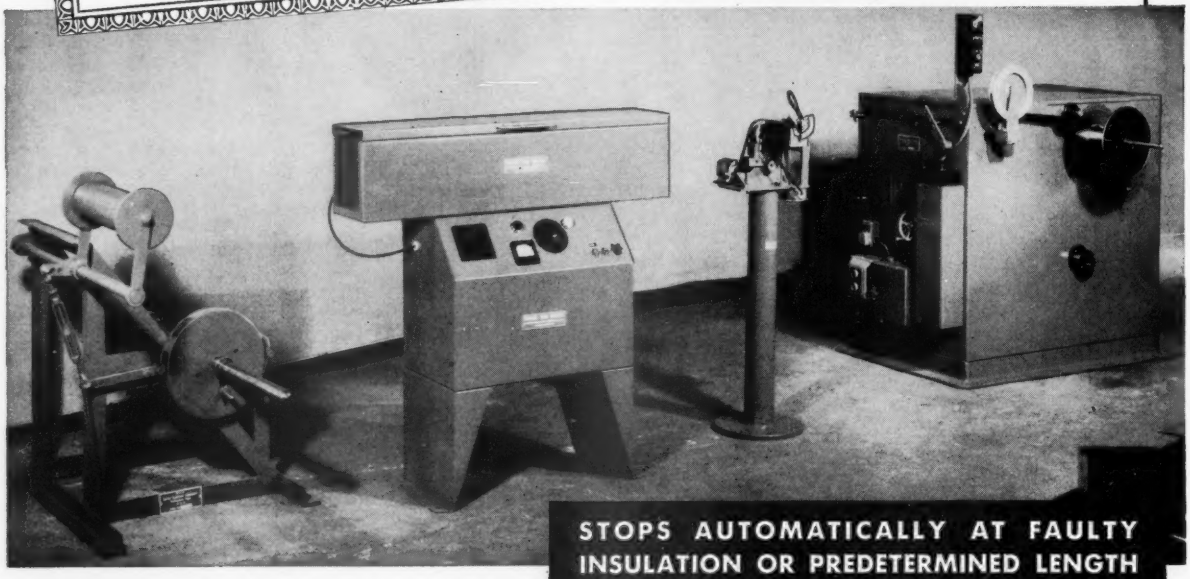
DAVIS

Automatic

SPARK-TESTING

Equipment

It insures against faulty wire insulation that causes customer problems.



STOPS AUTOMATICALLY AT FAULTY INSULATION OR PREDETERMINED LENGTH

DAVIS PAY-OFF (extreme left) automatically controls tension and braking, stops instantly when reeler or respooler shaft stops! Simply designed for left or right hand use . . . ruggedly built for lasting service. Shaft sizes: 1¼" or 1½"; for reels up to 30" diameter, 16" width.

DAVIS #4 SPARK-TESTER (left center) automatically stops at and locates insulation defects. It has a 36" stainless steel, bead chain electrode with maximum wire size of ¾" and wire speeds of 1200 fpm. Its volt-testing range is 1,000 to 15,000; up to 30,000 can also be supplied. Operates on 110 volts; other voltages obtainable. *Options:* footage can be increased by lengthening electrodes; electrodes available to accommodate up to 4" cable.

DAVIS WIRE MEASURING MACHINE (right center) with predetermined counter accurately measures wire footage. Counter is simple to set. At desired footage, its built-in switch shuts off power to reeler and respooler. Pedestal-mounted.

DAVIS REELER, RESPOOLER AND COILER is a versatile, variable speed unit with electrically or electronically controlled motor drive. Controls start machine with low torque to prevent wire stretching and/or breakage. Interchangeable shaft feature permits changing shafts in seconds. For reel diameters 6" to 30"; shaft diameters ⅝" to 1½". Constant footage device optional. Has electrical disk brake and safety cap for idler shaft. Easily accessible control synchronizes traverse variable speeds with spooling shaft speeds. Traverse width up to 16". Winding speed range: 10 to 1. Maximum wire speed: 1200 fpm. Unit adaptable for use with any type collapsible coiling head up to 30" diameter.

Accurate, dependable, easy-to-operate Davis products are available in complete assemblies as shown, or individually. Write for catalog bulletins and quotations on your requirements.

Davis ELECTRIC CO.

WALLINGFORD, CONN., U.S.A.

DAVIS WIRE & CABLE EQUIPMENT

HARNESS TESTERS ★ PAY-OFFS ★ TRAVERSES

SPARK TESTERS ★ SPOOLERS ★ TAKE-UPS ★ CAPSTANS

Correspondents throughout the world

Foreign Sales Representatives: OMNI PRODUCTS CORP. 460—4th Avenue, New York 16, New York

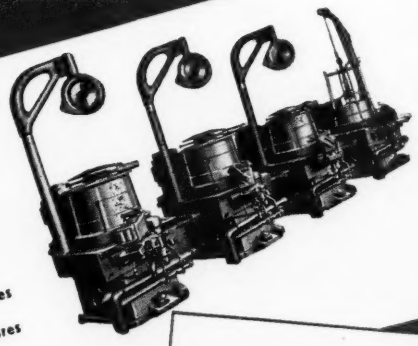
HERBORN

Non-Slip Continuous Wire Drawing Machines

with individual motor drive for each block

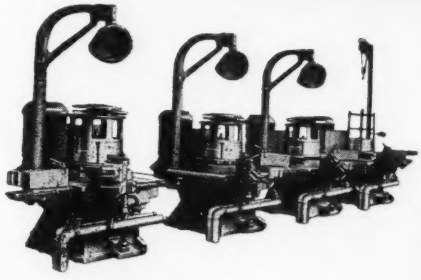
Model G I
with 4 drafts
in single block arrangement

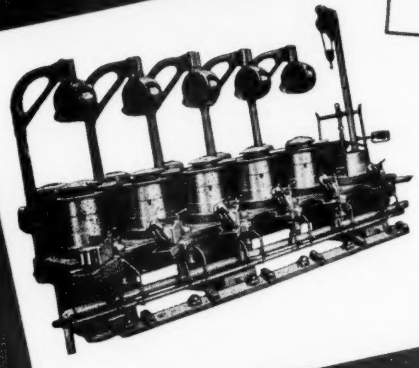
Inlet Φ
Low carbon steel wires .393"
High carbon steel wires .315"



Model G IId
with 4 blocks = 8 drafts
in single block arrangement

Inlet Φ
Low carbon steel wires .275"
High carbon steel wires .236"

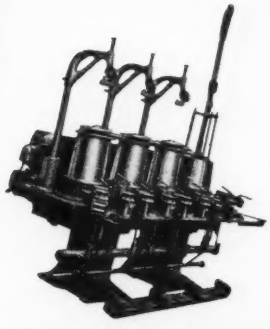




Model G St II
with 6 drafts

Inlet Φ
Low carbon steel wires .216"
High carbon steel wires .196"

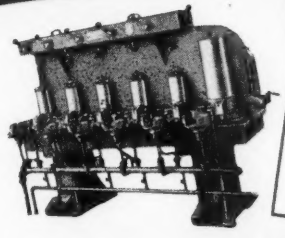
Model GM IIId
with 4 blocks = 8 drafts



Inlet Φ
Low carbon steel wires .118"
High carbon steel wires .0984"

Model GM IVd
with 6 blocks = 18 drafts

Inlet Φ
Low carbon steel wires .063"
High carbon steel wires .0551"



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Whether you Coat with *Solutions* or Cover with *Asbestos*...

YOU'LL DO IT BETTER, FASTER, AT LOWER COST WITH AN IOI SYSTEM OF ADVANCED DESIGN

● Are you looking for ways and means of cutting production costs in your wire insulating operations? The largest wire mills in the world have found the answer to this problem by installing wire insulating systems and machines designed and built by IOI.

Whether your operations involve solution coating with lacquer, enamels, organosols or plastisols, or covering with asbestos, there's an IOI unit of advanced design that will increase your production, cut your labor requirements and decrease your production costs.

The lacquering unit and asbestos insulating machine pictured are typical of IOI's developments in advanced engineering on sound basic principles, efficient design and rugged construction.

Write for these helpful IOI booklets:

"Lacquering of Insulated Wire and Cable," "The Handling of Webs and Monofilaments."

ORGANOSOL COATER—The organosol system shown above will handle 9 ends of wire, each end being coated with as many as 8 individual coats. It is the thirty-second such system installed by IOI. Photograph shows the general arrangement of the coating pots, the wire travel, the bottom idler sheaves and the base of the evaporating tower.

ASBESTOS INSULATING MACHINE—The IOI unit pictured at top left unwinds, wraps, cards, slicks, impregnates, cools, polishes, dries and winds—all in one continuous, fast operation. It handles a wide variety of wire sizes and asbestos wall thicknesses, utilizing hot or cold saturants. Easily accessible operating controls are located in base of machine. The unit is ruggedly constructed, easy to keep clean and maintain.

INDUSTRIAL OVENS, INC.

IOI ENGINEERING VERSATILITY

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flawless faster die finishing with scientific compounds

Modern die manufacturers such as New Jersey Carbide Die Co. demand Hyprez, the original Diamond Compound

HYPREZ

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High Precision DIAMOND COMPOUNDS

Serving many of the foremost plants in the wire industry, New Jersey Carbide Die Co., of Jersey City, uses Hyprez exclusively for rough finishing, lapping and polishing tungsten-carbide dies.

The continuing preference for Hyprez is built upon Hyprez superiority—maintained by research and control; by fast free-cutting action of pure diamonds precisely graded and uniformly dispersed in scientifically formulated vehicles. Hyprez provides the exact grade and concentration for every job.

Ask for a free demonstration

or technical bulletin No. W-654

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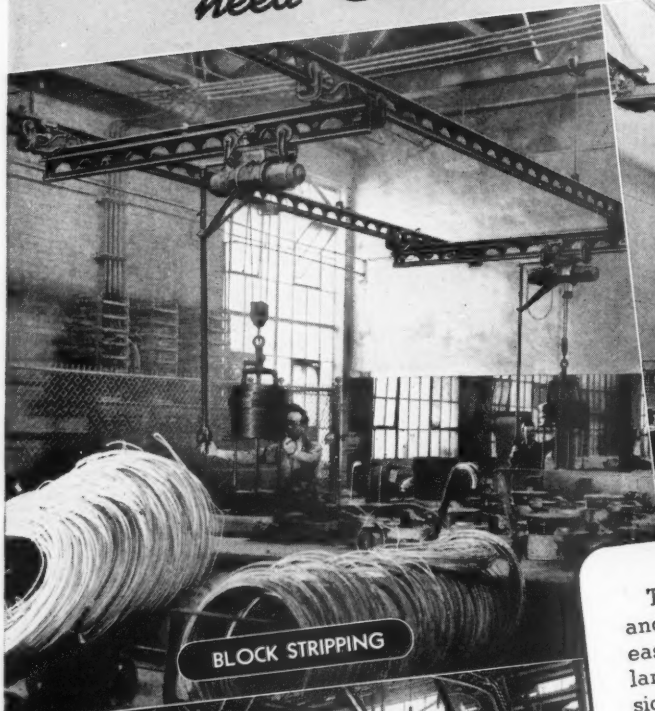
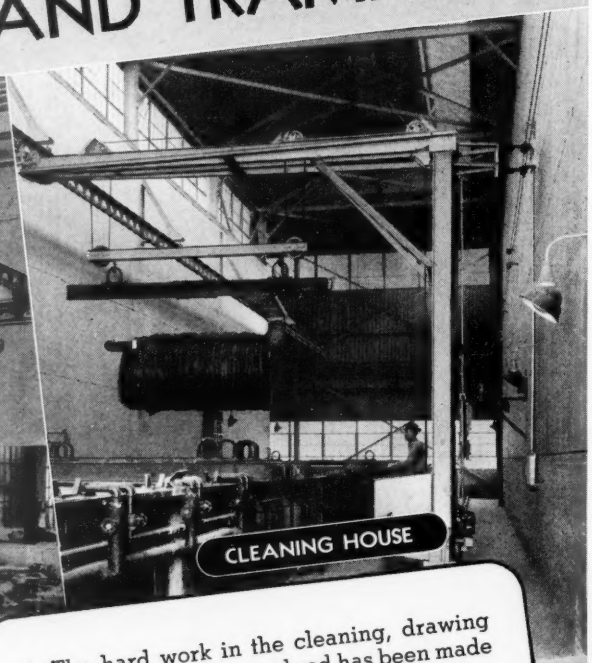
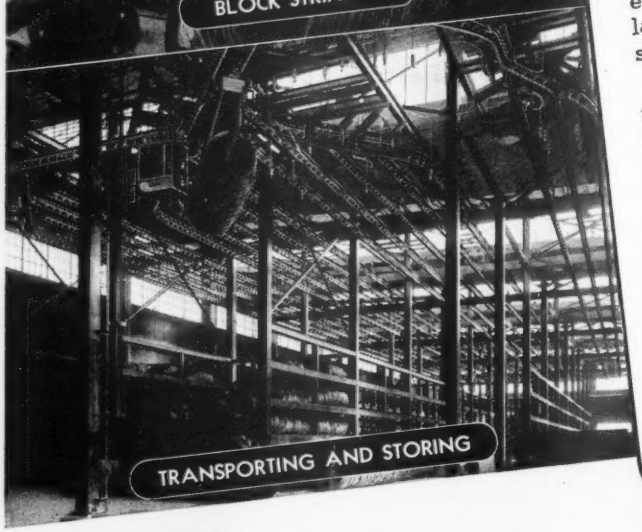
ENGIS EQUIPMENT COMPANY, CHICAGO 5, ILL.

431 SOUTH DEARBORN ST.

ROD AND WIRE PLANTS *need* CLEVELAND TRAMRAIL







The hard work in the cleaning, drawing and handling of wire and rod has been made easy, fast and safe by application of Cleveland Tramrail equipment especially designed for the work.

Perhaps no other single factor has been so influential in increasing production and lowering costs in the wire or rod mill as properly designed and applied overhead materials handling equipment.

Today more producers and fabricators of wire and rod are enjoying the many advantages of Cleveland Tramrail than ever before and the list of prominent names in this industry is growing rapidly.

It costs you nothing to learn what Cleveland Tramrail can do for you, but it may be of tremendous importance in the immediate years ahead. Why not investigate now?

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THE CLEVELAND CRANE & ENGINEERING CO.
9209 East 288th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

NOW CHASE® SELLS STAINLESS STEEL, TOO

Bars, sheets, wire, pipe and tubing now available through your Chase warehouse or sales office.

So many Chase customers use stainless steel in addition to brass and copper that we have added this metal to our regular line.

Now you can get the same top-notch Chase Service on Stainless Steel that you've been used to on other Chase products. Of course, regular delivery and cutting facilities are available on Stainless Steel orders, too.

Make Chase Your Headquarters for Stainless Steel, Too

All 24 Chase warehouses plus the Chase sales offices and Chase mills are ready to help you get prompt delivery. If your Stainless Steel order can't be filled from local stock, you'll get prompt shipment from another of the Chase warehouses or from the mill.

Chase® **BRASS & COPPER CO.**

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In this epochal "special," to be wholly devoted to the Annual Convention of The Wire Association, there will be many added values to justify your being suitably represented with special advertising. It is an opportunity to identify your company as an integral part of this great industry. Join with others to make this coming Convention an outstanding success in the celebration of The Association's 25th birthday.

You are offered exceptionally high reader-interest in the October issue, plus added circulation and longer than average life of the issue. For advertisers, it is value packed. Help to make this a memorable occasion.

The Wire Association will meet in Detroit in 1954, from Nov. 8th through the 11th, at the Statler Hotel. It will feature technical sessions, plant inspection trips, the Annual Luncheon and the Smoker-Dinner.

The issue contains pre-prints of the technical papers to be presented at the Convention and the final program of events. Anything and everything bearing on the Silver Anniversary Convention is included.

WHO SHOULD ADVERTISE? Any producer and seller of rods, wire, or machinery, equipment and supplies sold to the wire industry. If you are selling these products, put your best foot forward in the OCTOBER SILVER ANNIVERSARY CONVENTION ISSUE and cash in on the extraordinary interest in all things pertaining to wire at this time.

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WIRE AND WIRE PRODUCTS

J. EDWARD DONNELLAN, *Vice President*

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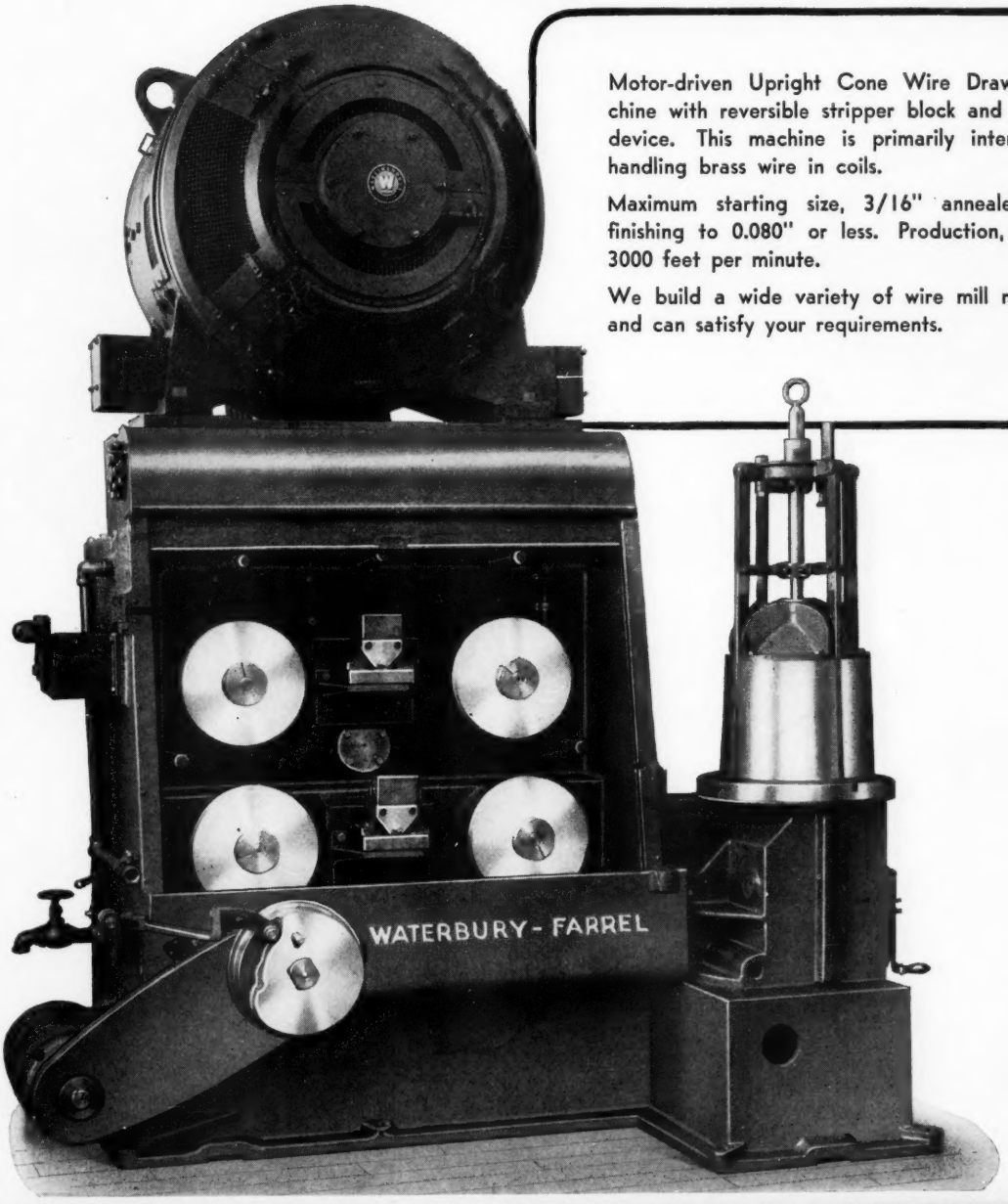
"It Pays to Advertise"

Just one in a wide variety of . . . .

WIRE DRAWING MACHINES



Motor-driven Upright Cone Wire Drawing Machine with reversible stripper block and string-up device. This machine is primarily intended for handling brass wire in coils.

Maximum starting size, 3/16" annealed brass, finishing to 0.080" or less. Production, 1000 to 3000 feet per minute.

We build a wide variety of wire mill machinery and can satisfy your requirements.

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Offices: Chicago, Cleveland and Millburn, N. J.

WIRE MILL EQUIPMENT—Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Pointers • Swagers • Bull Blocks • String-up Machines • Spoolers, etc. *COLD PROCFSS BOLT & NUT MACHINERY*—Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc. *POWER PRESSES*—Crank, Cam and Toggle; also Rack and Pinion Presses • Eyelet Machines • Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc. *MILL MACHINERY*—Rolling Mills: Strip, Rod, Wire Flattening, (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc.

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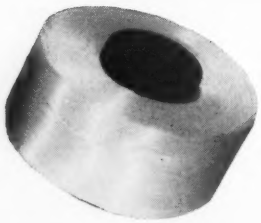
now made for all electrical insulations



A complete series of continuous filament yarns—including 75-, 150-, 225-, 450- and 900-series yarns—now are offered the wire and cable industry by Libbey·Owens·Ford.

L·O·F yarns are made in a wide variety of single- and multiple-end packages. They can be used directly on standard types of magnet wire serving and wire covering machines, as well as on braiders, knitters and other conventional textile equipment. Waxed yarns are available, as well as special after-treatments.

Why not consult us on your electrical insulation needs. Our expanded production facilities insure delivery of your quality L·O·F Fiber·Glass yarns on schedule. Contact your nearest L·O·F office (offices in 26 major cities). Or write: Libbey·Owens·Ford Glass Company, Fiber·Glass Division, 2664 Wayne Building, Toledo 3, Ohio.

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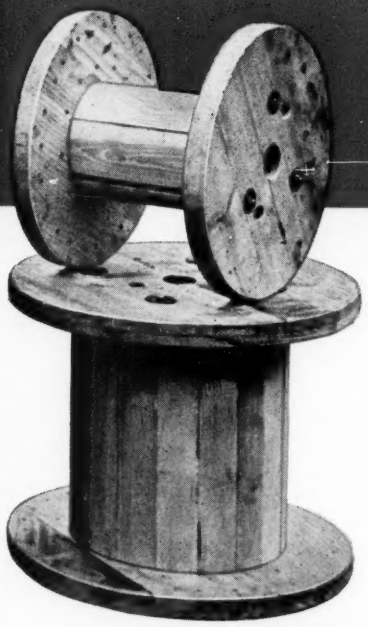

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within a radius of 200 miles from the plant. Fast freight will bring you Bridge reels in 5 days or less east of the Mississippi.

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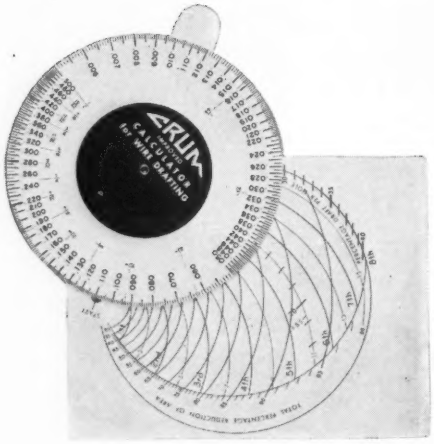
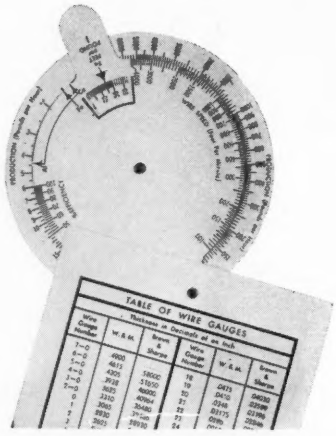
FOR WIRE DRAFTING



Front view of Crum Calculator.

THIS NEW DOUBLE-PURPOSE CALCULATOR WILL:

1. Provide quicker and more accurate information on die sizes and reduction areas;
2. Calculate wire production rates for various speeds and efficiencies.



Reverse view of Crum Calculator.

SOME OTHER FEATURES OF THE CALCULATOR

- Has new scale for more accurate determination of small percentages.
- Gives readings in B & S gauges.
- Intermediate lines provide reductions for 16 holes in one setting.
- New rectangular shaped back for better protection of calculator.
- More legible % draft-per-hole scale.
- Vinyl plastic construction, resistant to wear, warping, dirt, perspiration, wire drawing soaps—can be cleaned.
- Still fits your vest pocket.
- Handy tables of W & M and B & S gauges.
- Feet per pound calculating scale for steel, copper and aluminum wires.
- Durable, accurate, easy to use.

The improved Crum Calculator is worth its weight in gold in time saving —no laborious mathematical calculations necessary when you use it. Instruction sheet with examples accompany each Calculator. You should have one or more in your wire drawing department.

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WITH THE

DU PONT SODIUM HYDRIDE DESCALING PROCESS

1. SHORT TIME CYCLE

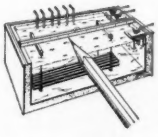
Only 15 seconds are required to get cold reduced-annealed strip clean and bright —10 to 20 minutes for fabricated articles, sheets, wire, rods, bars and forgings. Even heavily scaled forgings (½" scale thickness) take less than an hour!

2. NO LOSS OF BASE METAL

There's no danger of costly rejects due to pitting, etching, or loss of gauge with the Du Pont process—no matter how long work is left in the bath. This permits working to closer tolerances and assures high dimensional accuracy.

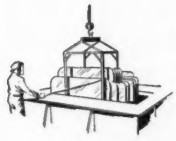
3. RETREATMENTS RARELY NEEDED

One pass through the sodium hydride bath will do the job completely. You can maintain uniform speed in production-line descaling. Quick completion of orders means you can substantially cut down on inventory in process.



4. SIMPLIFIED PROCESS

No scale-breaking or special racking procedures are required. Finished stock of any size or shape can be completely descaled with the versatile Du Pont process. Even dissimilar metals can be treated in the same bath—at the same time!



5. EASY TO OPERATE

Any pickler can be trained in a few hours to run the Du Pont Sodium Hydride Descaling Process effectively. You can do more work with fewer men and less equipment. And you save on time, space and labor costs.

6. DU PONT TECHNICAL SERVICE

If you are descaling metals which are unaffected by fused caustic at 700°F., it will be to your advantage to talk with us about the Du Pont Sodium Hydride Process. Du Pont pioneered this modern descaling method and can bring a depth of technical experience to bear on your descaling problems. There's no cost for this service which includes laboratory investigation of problems plus expert aid in the construction, installation and operation of the process. Just call our nearest district office or send in the coupon below.

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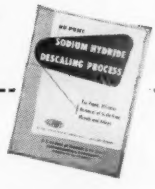

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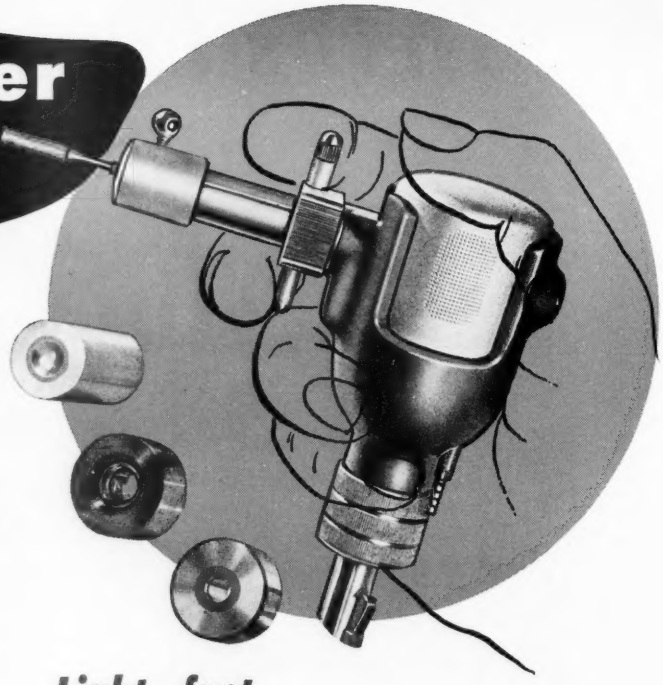
The Di-Profiler

(U.S. Pat. Pend.)

Reciprocating Hand Machine



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Faster, and far superior to manual techniques, the Di-Profiler is indispensable for cutting, lapping and polishing operations involving flat or curved surfaces on regular or irregular drawing dies.

Complicated and intricate dies and molds are finished in a fraction of normal time by using this efficient and precise machine with standard Di-Profiler diamond and tungsten-carbide tools.

In die and mold shops throughout the country, the Di-Profiler has paid for itself many times over through labor-saving cost reductions.

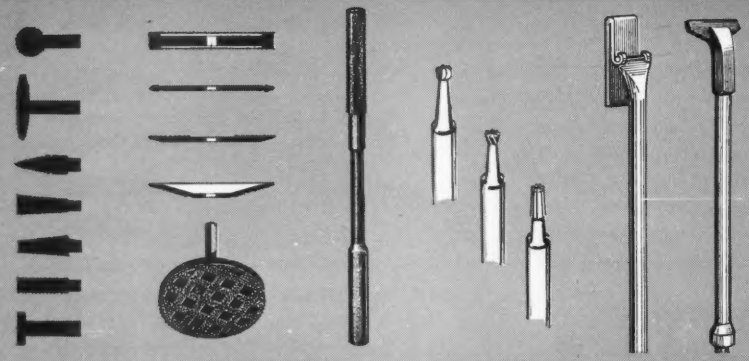
The low price permits placing the Di-Profiler in the hand of every operator in your shop.

Light, fast, variable speed and stroke

The Di-Profiler is rapid, precise, easy to operate—simple and sturdy in construction. Its weight of less than one pound and freedom from vibration eliminate fatigue and assure perfect control during operation.

The Di-Profiler has an adaptable stroke variable from 0 to 6mm (¼"), and a speed of reciprocation that can be varied from 0 to 100 strokes per second—a versatility that proves useful for every type of job.

Complete Stocks of T-C Cutters; Diamond Files, Disks, Points, Burrs, Scrapers



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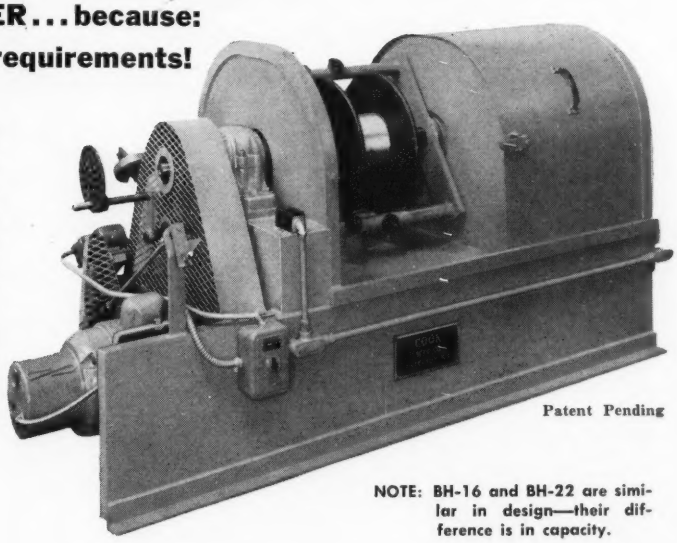
COOK'S COMPLETE LINE OF WIRE BUNCHERS, ARE IN GREATER DEMAND THAN EVER... because: their versatility meets individual requirements!

THE BH-16, BH-21 and BH-22 (at right) are machines that answer the wire industry's search for equipment that will bunch any number of lines while maintaining perfect concentricity. These Cook Bunchers which have a reel capacity of 200, 350 and 500 pounds have successfully stranded 7, 10, 16, 19, 41 and 65 lines with such concentricity that the passage through an extruding die of only one mil clearance was not impeded. Due to our unique design and rugged construction the maintenance cost is extremely low. High production rate makes the COOK BUNCHERS ideally suited for the extruding field where concentric bunching is essential.



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NOTE: BH-16 and BH-22 are similar in design—their difference is in capacity.

BUNCHER SUPPLY STAND

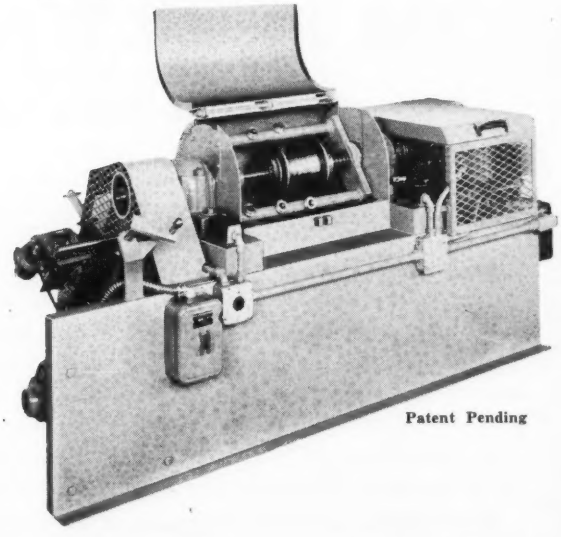
This extremely versatile COOK STAND can be built to the customers specifications.

THIS STAND IS A 'NATURAL' WITH ALL COOK BUNCHERS

The "V" shape design eliminates crossing and tangling of wire lines. Each spindle is mounted on a sealed ball bearing which is lubricated for life. The reduced friction drag permits wire as small as #34 B & S gauge to be rolled off a 30 or 40 lb. spool. Each spindle is provided with individual strand tension control.

This Supply stand is equipped with automatic shut-off control to stop the buncher if a wire should break or if a reel runs out. The electric relay principle eliminates the need for individual threading through an eyelet as with a mechanical finger drop type.

THE BH-12 and BH-8 (below) embodies all of the remarkable advantages peculiar to COOK BUNCHERS. Capacity: 8" x 6" reel, 40 lb. load, and in addition is particularly well suited for High Speed bunching of extremely fine wires, including such constructions as 7/36".



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WHAT EVER YOUR WIRE-BUNCHING PROBLEMS ARE—WIRE COOK . . . or your letter of inquiry will receive prompt attention as well.

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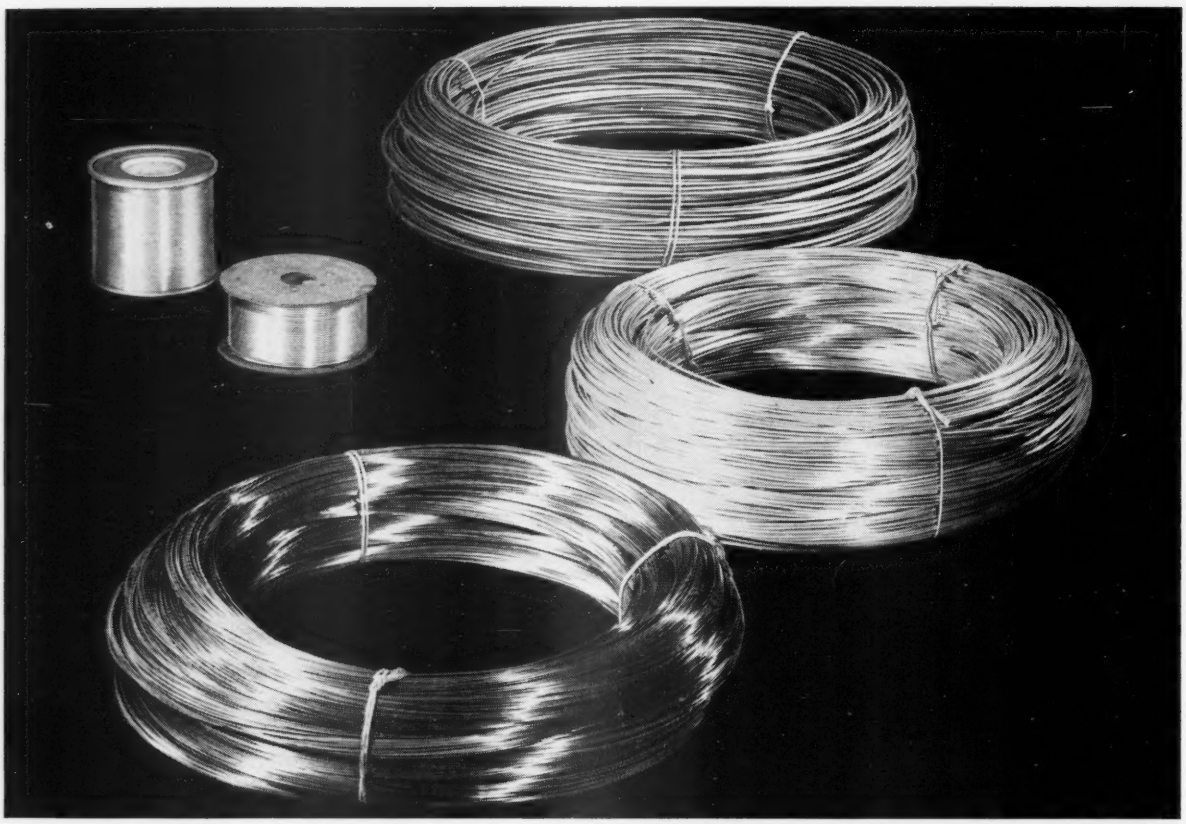

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ROEBLING HIGH CARBON WIRE is packaged in many ways... and for every kind of usage there's one particular type of packaging that will bring top handling and production efficiency... new economy in your plant. For certain wires, Roebling's new large-size reels or new disposable spoolless cores have special money-saving advantages:

The large reels are ideal for long runs. They reduce down time to a minimum.

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You *pay* for the best when you buy high carbon wire. Make sure you *get* it in wire and packaging. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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written by Kenneth B. Lewis, as only he could write. This remarkable book treats of the various operations in wire making, giving the history and theories underlying each process, tracing the development of machinery, equipment and supplies used in the industry, and naming those individuals and companies involved in the evolution of our industry to its present stage of development. A highly readable treatise. You'll like it!

The book, sponsored by the Wire Association, is an unusual contribution to the literature on the art of making wire. It is not a handbook nor reference work, but is one that will bear much reading, re-reading and study. Any wire man will be better equipped for his work through a knowledge of the contents of Mr. Lewis' book.

The edition is limited and orders can be filled only as long as the small supply lasts.

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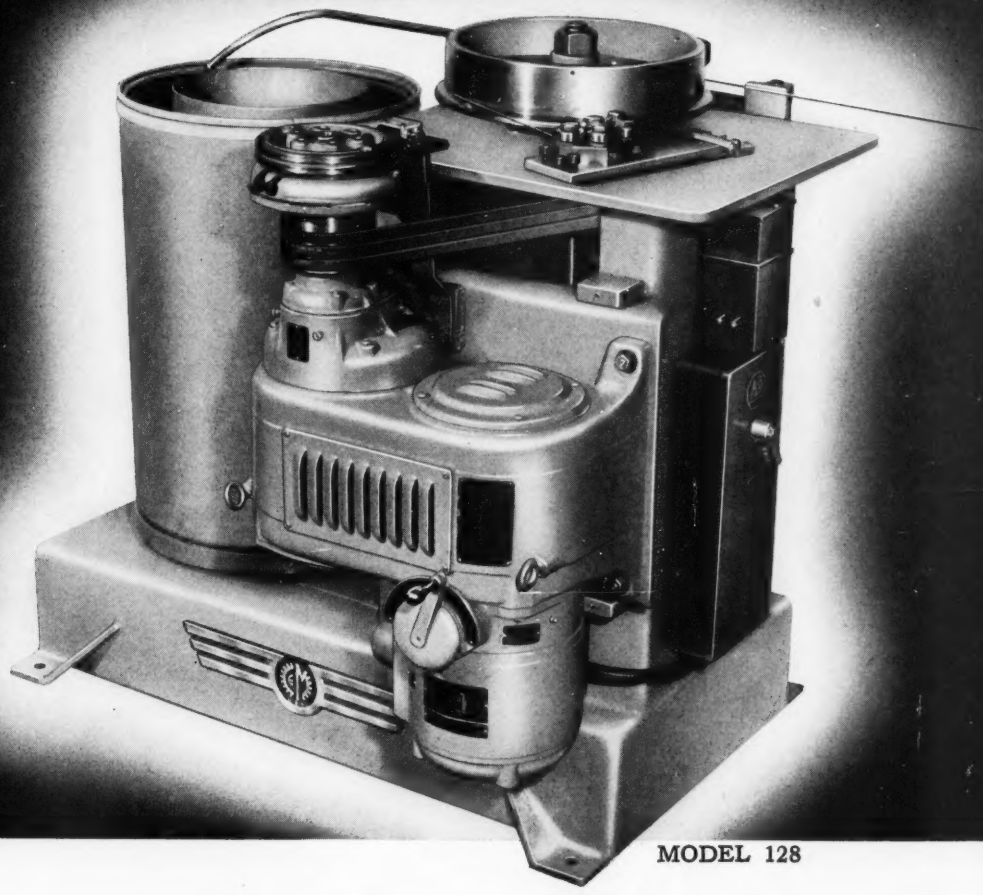

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Look! No Hands!

Now you can pour wire in one continuous 600 pound strand * into a single package...no tying...no contamination...no scrap!!!

DIRECT PACKAGING of continuous strand material is performed rapidly with the new Coulter & McKenzie Model 128. It is adaptable also for single-die reduction, tinning take-up, and respooling. Applicable to the following materials:

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Insulated Wire	Low Carbon Steel	Tubing
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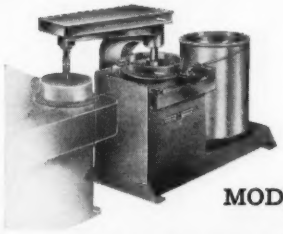
SPEEDS to suit all materials and operations.
POWER to pour the finest strand or reduce and package the coarsest material.



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Write for engineering questionnaire. Low cost models available for vertical or horizontal power take-off.

Other machines are available for continuously drawing and packaging fine and coarse wire.

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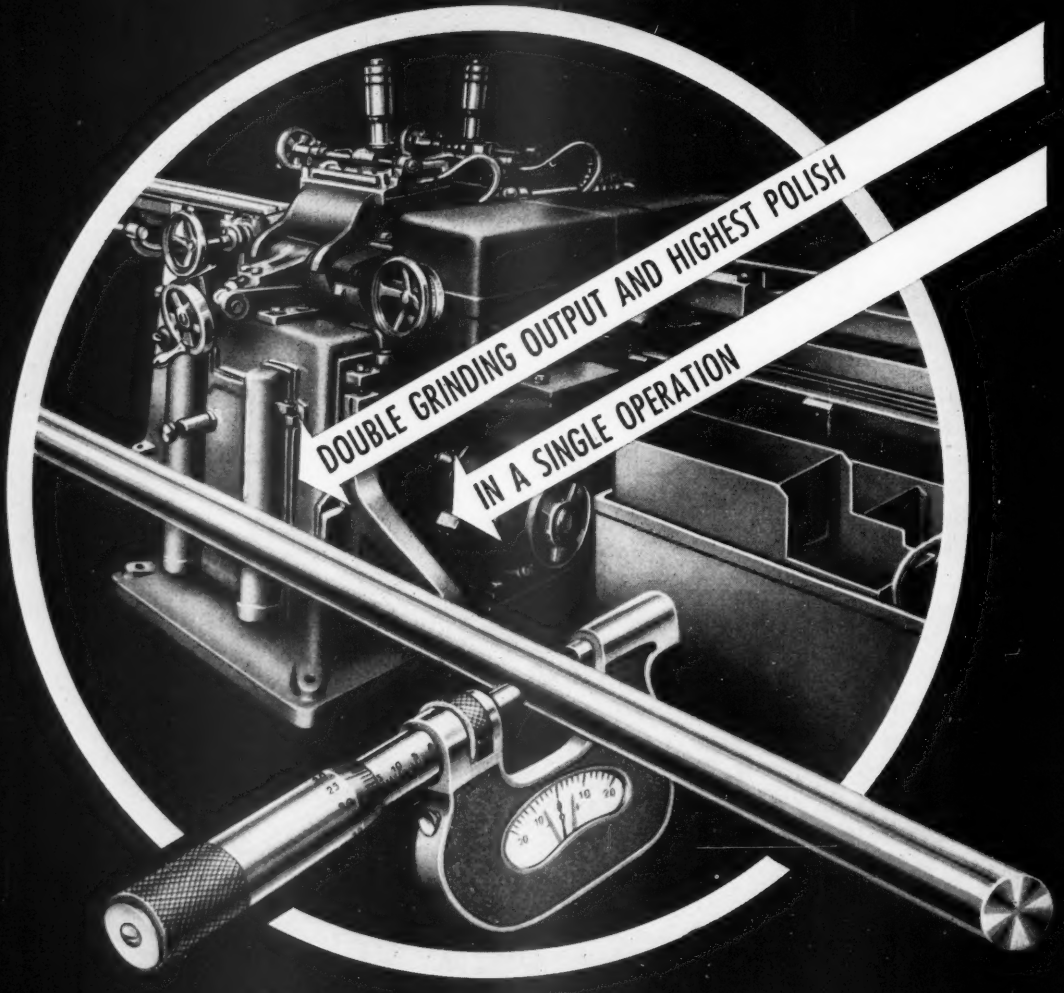

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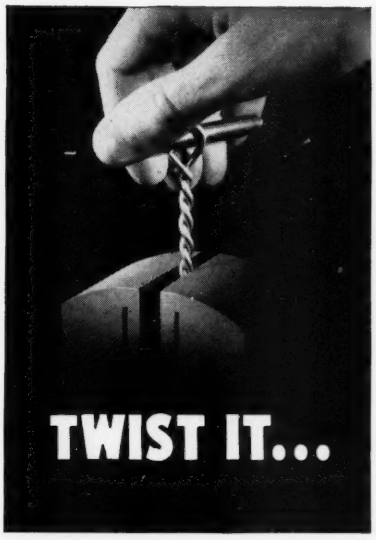

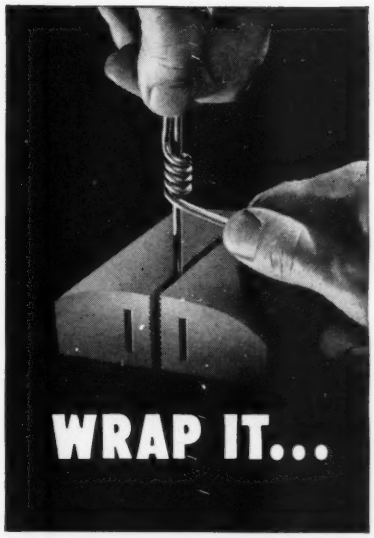

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The ductile coating of zinc on bethanized wire is undamaged, even when the wire is wrapped around its own diameter.

Bend a piece of bethanized wire, twist it, wrap it around its own diameter—even draw it to fine gauge—and the zinc coating stays put, without cracking, flaking or peeling off.

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Besides withstanding severe forming or fabricating operations, bethanized coatings are available in weights to fit your particular requirements. For example, we can supply a coating thickness much heavier than conventional galvanized coatings.

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STATLER HOTEL — JUNE 11, 1954

The Program

9:00-10:00 a.m.—REGISTRATION at the new Colorado Fuel & Iron Corp. Warehouse, 2444 Saybrook Avenue, Los Angeles 22. (Directions to drive—East on Santa Ana Freeway to Washington Blvd. turn-off. North on Washington to Saybrook) TIME IS IMPORTANT! OR—before dinner at the Statler Hotel.

10:00-12:00 a.m.—PLANT TOUR—National Screw & Manufacturing Company, 3423 South Garfield Avenue, Los Angeles.

12:30- 1:30 p.m.—BUFFET LUNCHEON to be served at Colorado Fuel & Iron Corporation Warehouse, courtesy of C. F. & I.

2:00- 4:00 p.m.—PLANT TOUR—Standard Steel Spring Division, Rockwell Spring & Axle Co., 6443 East Slauson Avenue, Los Angeles.

6:00- 7:00 p.m.—COCKTAILS—at the Statler Hotel, Los Angeles Room.

7:00 —DINNER—at the Statler Hotel, Los Angeles Room. Tickets for dinner: $6.00.

Speaker

DR. LEWIS PERRY, Prof. of Economics, Pomona College, Claremont, Cal. will talk on:

"The Impact of Changes in Defense Spending on Southern California Industries."

Film

"STEEL PARTY LINE"—16 mm color and sound picture on Production of Wire from mine to Finished Product by Colorado Fuel & Iron Corporation.

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RICHARD E. BROWN, *Executive Secretary*

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The Wire Outlook

There is a general optimism regarding the steel outlook, with a gradual upturn expected for the third quarter.

The business decline that began about the middle of 1953 has continued to show a slight falling off, but a significant fact about the current situation is that consumer buying has been healthy and our economy is using up goods now faster than they are being produced. If consumption remains at present levels, it is obvious that production must increase before long.

Businessmen generally look for 1954 to wind up with a showing of a little less or just as good as last year—a few expect it to be better. Even the New and Fair Deal prophets of gloom who predicted disaster under the Eisenhower administration are reported to be somewhat disturbed over the fact that their expectation of economic disaster—or should we say "hope"—is not materializing.

Contracts for building construction awarded in March were the highest in over fifty years, including new highs for residential, non-residential, utilities, and public works. The total ran over 1½ billions, up 25% over February and 13% over March, 1953. Also March was the seventh month out of the last twelve for which new highs were recorded.

One prominent industrialist stated recently that industry will spend 16 billion dollars this year for modernization of plant facilities and new equipment and another 11 billions for capital expenditures. In 1951 some 51% of the total spending went for modernization. Last year it rose to 57%; this year it is expected to be 60%, with 60% or better for the next three years precast. Such expenditures are an admixture of economic necessity and faith in our future.

Wire orders have continued to pile up to an extent that has exceeded the anticipations of even the manufacturers themselves. Most of this has been due to the demand from agricultural buyers and the mills are trying to convince jobbers that they would be wise to carry better inventories. One large producer reports sales of finished wire products about double of those for the first quarter of 1953.

Ingot and rod production of most integrated wire mills is somewhat up, but non-integrated mills are reported to be drawing more tonnage than they are buying, indicating that there are still unused inventories lying around.

Nail wire demand is more active. Upholstery spring wire orders have turned up, pointing to the exhaustion of inventories, but mechanical spring wire is still slow. Cold heading wire sales are running some 30% under 1953. Specialty wire, alloys and stainless are showing progress, although have not improved to the same degree as low carbon.

Manufacturers' wire, while better, is still below expectations due to unused inventories. Demand for all types of fasteners is relatively poor, because while the construction industry is placing more orders, the warehouses and railroads have dropped below normal on their purchases. The ability of mills to ship promptly has encouraged most buyers to keep their buying on a day-to-day basis, carrying a bare minimum of stock.

Welded wire fabrics, due to construction activities, are moving well and producers look for a good year. Such products are used in concrete reinforcement, flooring, for roofs and walls in buildings, in concrete pipe, highways, airport landing strips and many other applications.

While price cutting has been apparent for many products, wire prices have remained remarkably steady. Average wholesale prices haven't been lower than 109.4% of the 1947-49 average nor higher than 111% for a year. Consumer indices averaged 114.4% for 1953, rose to a high of 115.4% last October and currently are reported at 114.8%.

All this would indicate that if further changes are to be registered, they will be for the better.

—from the Editor's Desk

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—and how to use them...

(No. 3 of a Series)

This is the third in a series of advertisements cataloging the complete line of Steelskin Lubricants. Keep this for handy reference.

PRODUCT	SHIPPING INFORMATION	USES
AM POWDER	275# NET FIBER DRUM	For dry-drawing steel for rope, tire bead, poultry netting, screen cloth, springs and nails. Also for dry-drawing galvanized.
W-COATING COMPOUND	300# NET FIBER DRUM	A low-cost borax-base coating suitably buffered to provide for better drainage and protection, with longer solution life.
DET PASTE COMPOUND	440# NET	An economical highly-fatted emulsion-type wet-drawing lubricant for use on ferrous and non-ferrous coarse and intermediate sizes.
T-2 POWDER	250# NET FIBER DRUM	An inexpensive compounded sodium soap for use on high- and low-carbon rod and wire. Readily cleaned after drawing and annealing.
CH POWDER	250# NET FIBER DRUM	A very rich metallic stearate for use on stainless steel and fine high-carbon wire. Also for dry-drawing galvanized wire.
WT-G PASTE COMPOUND	400# NET STEEL DRUM	This readily dispersible paste is especially suitable for drawing coarse copper-coated wire (welding rod) and galvanized wire (wet).
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Vol. 29 June, 1954 No. 6

Practice and Control for the Manufacture Of High Carbon Commodity Wire

by Robert H. Isenberg
Metallurgical Engineer
Pittsburgh Steel Company
Monessen, Pennsylvania

The question of the relative qualities of high carbon wire is one that has both plagued and intrigued steel industry personnel for many years. The controls instituted to provide for uniform quality of such products cannot be solely relegated to the Wire Mill since each department within the integrated steel mill must assume its share of responsibility for the performance of the end product in a customer's plant.

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Although this is a regional wire meeting, we do not feel that we are amiss in stressing the practices and controls for the manufacture of high carbon wire which must be exercised in the various departments involved within a steel plant.

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It is a noteworthy fact that the genesis of quality control should start in the Open Hearth Department. The ingot as produced is the initial indication of the quality to be expected in the finished wire and to a large extent governs the controls necessary in future processing. It is our belief, and we have confirmed it by actual test data, that the so-called tramp alloys, such as copper, tin, chromium, molybdenum, and nickel, must be kept within specific limits to provide for the uniformity of performance of high carbon wire. For this reason, we are selective as to the scrap charged into the open hearths for these critical grades, and every effort is made to melt steel to minimum residual alloys.

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During the melting periods, high carbon heats analyzing higher in these so-called tramp alloys than are deemed usable for such critical end uses are diverted to less critical applications. Sulphur and phosphorus are also held to a minimum. We are all aware of the effect which the element carbon exercises in high carbon wire manufacture, and the Open Hearth Department

Robert H. Isenberg

The author graduated from Allegheny College in 1932. In 1933, he was employed by Pittsburgh Steel Company, and since that date, he has held a succession of positions within the Metallurgical Department. During these years, he has had experience in all phases of quality control from the Open Hearth Department through the various stages of wire manufacture.
His paper was presented at the Regional Meeting of the Wire Association in Worcester, Mass., on April 22, 1954.

is given instructions to exert all efforts to melt heats to an aim analysis within the standard specified ranges. Since the standard carbon range for such high carbon heats is usually .10, it may be noted that heats finishing throughout this range can only result in costly and time consuming alterations in Rod Mill, Patenting, and Wire Mill practices in order to meet exacting specifications required. For this reason, we aim for consistent melting practices, and such heats naturally respond to uniform quality control practices in the finishing stages of manufacture.

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The Blooming, Billet, and Bar Mills affect to a large extent the surface qualities to be expected in the finished wire. Rigid controls as to heating, temperature, and rolling practices are outlined to this department to provide the surface required for these critical applications. As a further measure of control, semifinished billets and bars are routed to our Reconditioning Department where a visual examination of each bar or billet is performed. Objectionable defects are removed by hand chipping before such steel is released for further processing. Semifinished steel showing defects in excess of that deemed necessary for quality performance is scrapped and returned to the Open Hearth Department. If the proper controls are exercised, however, the amount of reconditioning and rejections should be minor.

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It is imperative that the Rod Mill furnish a rod true to commercial tolerance and free from surface imperfections that would impair the performance of the finished wire. Testing is performed in our plant by a reverse twist test and additional inspection is performed by macroetching and a good visual examination to make certain that the rod surface is suitable for the end application.

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To this point, we have listed the quality controls exercised on high carbon wire commodities over which the Wire Mill Department does not exercise any jurisdiction. Any deviation from such control practices should, however, be brought to the attention of the Wire Mill so that proper precautions may be taken during patenting and wire drawing to meet the requirements specified.

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Assuming that a heat of steel has met the quality control specifications to this point, it is solely the responsibility of the Wire Mill to exercise proper care so that the wire as shipped is properly cast and possesses the uniform ductility and toughness necessary for the severe forming operations. In our plant, this embodies the patenting, actual wire drawing and galvanizing, if necessary, for the particular end application. Oil tempering is also under the supervision of this same department. We will briefly describe the controls and practices outlined for each of these operations and use for illustration the following commodity wires:

1. **Zig zag Special Spring Wire**
2. **Galvanized Steel Core Wire For Aluminum Conductors, Steel Reinforced (ACSR)**
3. **Oil Tempered M B Spring Wire**

Patenting:

It is a recognized fact that patenting is the heart of any high carbon Wire Mill control. In view of the critical nature of these high carbon wire commodities, wherein a tensile strength range of 30,000 to 35,000 p.s.i., is specified, it is easily apparent that very delicate control of patenting should be established. Any factors of operation and maintenance that contribute to irregularity or abnormality in turn contribute to improper steel structure with subsequent problems in both wire drawing and maintenance of uniform mechanical properties. We have found that for these critical applications, the close control required necessitates lead patenting with the exception of oil tempered wire in which air patenting is practiced to afford better scaling and thus improve the surface characteristics.

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Chart I lists the patenting aims to be followed in the three types of wire in question.

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Representative tests are taken from each round to insure that all quality control specifications are being met. If some abnormality is encountered, all rods are repatented or diverted to other uses.

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In order to obtain the uniformity as outlined, it is necessary that the physical equipment be checked periodically to insure that all parts are in good working order. The particular unit on which the bulk of our high carbon rods are patented is a 60 ft. furnace with three micromax controlled zones. This is a 36-block frame and speeds are controlled to permit a production of 100 tons per twenty-four hour period at full capacity. Exit rod

CHART I

Grade	Patenting Practice	Tensile Range	Reduction in Area Minimum
Spring Wire	Lead	140,000 - 150,000	45.0
Core Wire	Lead	148,000 - 158,000	45.0
Oil Tempered Wire	Air	130,000 - 140,000	48.0

Maximum Tensile Spread on Rods - 12,000 lbs.

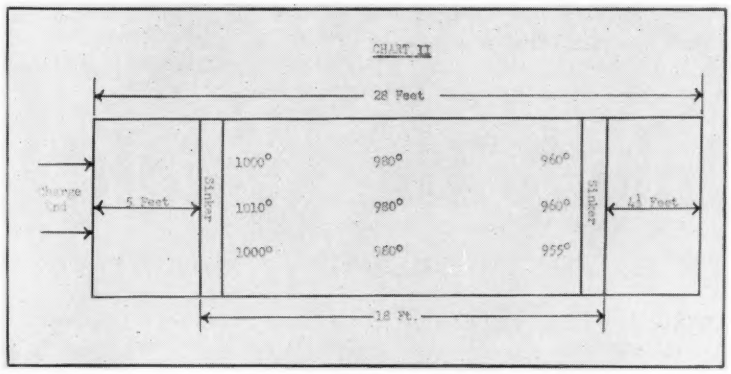
Maximum Reduction in Area Spread on Rods - 5.0%

temperatures are checked frequently with an optical pyrometer and are expected to be in the range of 1690° to 1710° F. Furnace controls are adjusted to meet this temperature aim and the rods are at soaking temperature for 10 to 12 ft. Cabling is detrimental, and every effort is made to eliminate this condition. We operate a single lead pan and speeds are maintained to permit the rods to be in the lead for a minimum length of time of 35 seconds. This lead pan is 28 ft. long which permits an effective dip of 18 ft. Temperature is controlled by a thermocouple placed in the center of the pan and is recorded on a micromax chart. In Chart II, we present a sketch of this lead pan and show the variation to be expected at a time when this lead pan was being operated at 975° F. Temperature variations were obtained by our Fuel and Combustion Department.

properly patented to a definite tensile strength range as required for individual orders, accompanied by the fullest degree of ductility. Proper patenting, therefore, includes uniformity of quenching and of the rate of quench together with a closely controlled temperature of the quenching medium. The controls as outlined previously include these provisions, and the resulting patented stock in all cases should embody good ductility.

Wire Mill

Since bright and galvanized high carbon wire is multiple drafted on high speed wire drawing machines, the importance of proper cleaning and coating cannot be minimized. We employ straight line cleaning with 8.0 to 12.0% H_2SO_4, and all rods are double cleaned to insure complete freedom from scale with



All high carbon wire must be drawn from stock which has been no pitting. Lime or borax is used as a protective coating and lubricant carrier. This should be heavy and uniform enough to eliminate excess friction when drawing.

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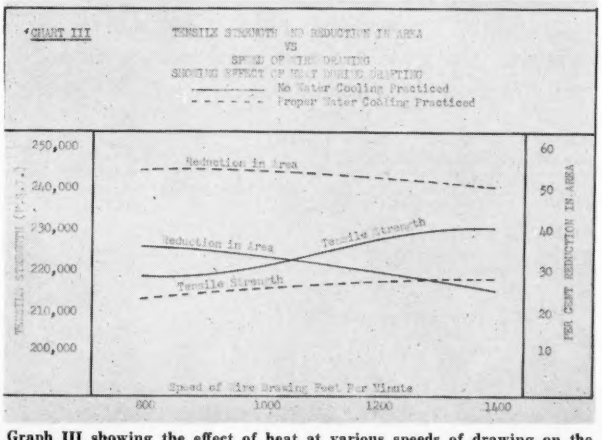
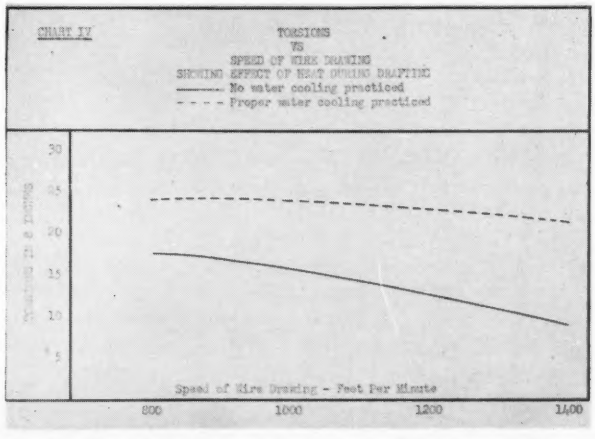
In any high carbon Wire Mill, the equipment must be maintained in condition to provide the uniformity in drawing and cooling of the wire in process to meet the exacting demands of the trade. We use exclusively tungsten-carbide dies in order to maintain the close tolerances required and tonnages demanded in production. Die holders and blocks are water cooled under 60 lb. pressure to provide a uniform and cool finished wire temperature. Blocks are periodically taken from production and cleaned so that proper maintenance is established. We have found that maximum drawing speeds and production can be maintained if all quality controls as listed previously are consistently met. It is, therefore, evident that the Wire Mill must exercise uniform control as to established maximum speeds on each size, proper cooling of equipment, proper care of lubricant in the die boxes to eliminate excess friction resulting in heat and scored surface of the wire, and uniformity of cleaning and liming the rod or wire to insure more efficient cooling controls. Charts III and IV serve to illustrate the effect of heat during drawing on the various ductility factors, such as tensile strength, reduction in area, and torsional properties. Tests

(*Please turn to page* 666)



Graph III showing the effect of heat at various speeds of drawing on the tensile strength and reduction in area. The mechanical properties listed were obtained in the manufacture of .135" Special Zig zag Spring Wire. The practice used was to draft four holes to size from a .225" lead patented rod (148,000 lbs. p.s.i. tensile strength and 52% reduction in area). * * * * * * * * * * * * * * * *



Graph IV showing the effect of heat at various speeds of drawing on the torsional properties. The mechanical properties listed were obtained in the manufacture of .135" Special Zig zag Spring Wire. The practice used was to draft four holes to size from a .225" lead patented rod (148,000 lbs. p.s.i., tensile strength and 52% reduction in area). * * * * * *

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STANDARD SIZES

Flange	Traverse	Barrel	Arbor
2½"	3" 3½"	1⅜"	.628"-.633"
3"	3" 3¼" 3½"	1¾" or 2"	.625"-.633"
4¼"	3" 3¼" 3½"	3¼"	.635"
4½"	3" 3¼" 3½"	2½"	.635"
4½"	6"	2½"	.635"
5"	2¾" 3"	3.880"	.531"
6"	3" 3¼" 3½"	3½"	.635"
6"	3" 3¼" 3½"	3½"	3"
6"	6"	3" or 3½"	.635"
6"	6"	3½"	3"
6½"	3" 3¼" 3½"	3½"	.635"
6½"	3" 3¼" 3½"	3½"	3"
6½"	6"	3½"	.635"
6½"	6"	3½"	3"
7"	3" 3¼" 3½"	3½"	.750"
7"	6"	3½"	.750"
8"	3½" 6" 6¼"	4"	3" or 3¹³⁄₁₆"
8¼"	3½" to 7½"	4"	3.630"
10"	6"	5"	Optional
12"	6"	6"	Optional

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When you can reduce shipping costs, reduce maintenance, and eliminate some of your delays from snags and breakage—you've gone a long way towards cutting spooling costs! Best proof of ACROPAK superior performance are the millions of these spools now used by the biggest names in the wire industry. Let us give you the FACTS.

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616 Fifth Street N., Minneapolis 1, Minn.

Manufacturer's Wire

by Rodman R. Tatnall
Field Service Metallurgist
Colorado Fuel & Iron Corporation
Wickwire Spencer Steel Division
Buffalo, New York

This paper was delivered by Mr. Tatnall at the Worcester Regional Meeting of The Wire Association on April 22, 1954. In it he gives a broad treatment of the subject giving the more common types of applications and outlining some of the problems of producing the grades of wire in this category.

A paper on Manufacturer's Wires can cover such a broad field both in subject matter and treatment, one is apt to begin a discussion at some random point and discourse at length without any coherent plan. Perhaps, indeed, this is the best method of sketching the meaning of the term and its present day significance.

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The term Manufacturer's Wire has become established to cover a broad classification of wire, recognizing special requirements of a fabrication process, or special requirements of a certain end use. It might be of interest to quote at this point from the 1926 Catalogue of a prominent wire producer:

> **"When wire is desired for manufacturing purposes it is necessary to know all the conditions of use to be sure of obtaining just what is wanted. There are many analyses, and several grades of varying ductility, toughness, or hardness, all of which enter into the choice of the proper grade to be furnished. The first point to be determined is the general way in which the product is to be used—if it must be stiff and act like a spring, a high carbon is indicated. If form merely is desired, as in a calendar frame or an article of kitchen ware,—a low carbon steel should be used. If severe forming or flattening are required, a soft or annealed wire may be necessary. Free turning calls for screw stock, conditions of finish may require coppered, liquor finish, tinned, or galvanized. As these terms are all the stock in trade of the wire maker, definitions must be understood."**

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In the light of present-day technicalities, these statements appear somewhat elementary, but they are the fundamental basis of the development of special purpose wires.

Traditionally, Manufacturer's Wire has always been differentiated from Merchant Wire as a class. Merchant Wire is, of course, the general purpose soft wire, usually low carbon analysis, and it is made to have no particular characteristics and designed for no particular end use. But actually, from this nondescript type of wire, various Merchant products, such as Bale Ties, or various types of Fence, have developed, as well as certain special types of wire classified by their particular application, an example of which is Telegraph Line Wire.

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It is only a step further to modify Merchant wire practices by selection of raw material, refinements in processing, and control of operations, determining by experience that which results in a wire most suited to meet some special manufacturing purpose. Even in the realm of one grade of wire, the finished article may demand a certain amount of strength, the fabrication may require a certain degree of workability, or the application may demand special features of size tolerance, or wire finish or condition of the material. Sometimes even performance of the finished article is an important consideration. In any case, it is seldom that any single characteristic is required alone, the combinations desired sometimes taxing the ingenuity of the best of wire men.

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One phase of the characteristics of Manufacturer's Wire which no catalogue can adequately present is the all important matter in present-day industry of the growth of specialized manufacturing and particularly the adoption of special purpose high speed automatic machinery. It is one thing to make three bends in a length of wire one at a time in a hand tool, and quite another to hold the wire in a fixture and make the bends all at once with air operated jigs moving so fast as to actually form by an impact blow.

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Thru the years, descriptive names, usually associated with the end product involved, were applied to the multiplicity of special purpose wires developed. It is readily appreciated that the details of these developments and the practices to produce them were for a long time recorded only in the memory of the wire mill superintendent, or perhaps in his notebook or the records of the particular mill that was called in on the problem. Gradually, however, the characteristics of these wires came to be a matter of user-producer specifications, as the volume of use brought other mills into the field. We are actually, even now, only catching up with definitions and industry standards for some of these types of wire. Such standards serve to record those characteristics most suited for a particular product, and once established are not only the basis of wire practice, but also may be the

basis of specifications governing acceptance by the user.

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The commodity names applied in the course of development of these wires make an interesting study. Some may denote only a general field of application. For instance, Brush Wire, Hose Wire, or Weaving Wire indicate only a broad application and do not show any specific end use. Within these groups, special characteristics are required for many specific end uses of the products, and a variety of wires are furnished. Again the commodity names are derived in many cases directly from the end use of the product to be made, and usually refer to one specific item of manufacture. Many of the commodities are very similar types of wire, differentiated largely by the specific end use. A good example of this is the similarity between Hair-pin and Paper Clip wire. Apart from a possible difference in finish, the physical characteristics of these wires are very similar.

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A new grade or type of wire is usually developed by consideration of the results of trial of some type of wire judged to approach the desired characteristics. If modifications are indicated, the properties are tailored according to the desired changes. It should be sufficient to point out here that the means of such tailoring are available in the control of material analysis, heat treating, and drafting practice. The adaptation of these three factors within the limits afforded by any one mill is dependent on the equipment at hand, and is worked out to produce the wire to the best advantage of that particular mill. It is seldom, therefore, that a wire made by one producer duplicates in every one of its characteristics a wire made to meet essentially the same standards or specification by another.

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The production of Manufacturer's Wire to a specification carries an implied obligation which is actually two-fold. In addition to the obvious acceptance of limitations on mechanical properties, size, and other elements which can actually be measured, there is a degree of implied obligation as to the uniformity of these characteristics, as well as general good workmanship. There is also a very important implication even in cases where the specification is only the commodity name indicating the final use of the wire, and that is the obligation to furnish a wire which will successfully do the particular job proposed. In other words, the wire supplier undertakes to furnish performance in the user's plant, as well as to meet the letter of the specification.

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Most specifications are clear and definite as far as they go. Measurements of specific elements can readily determine compliance or deviations. However, problems arise when the type of test specified does not exactly measure the particular characteristic it is desired to control. This is especially true where the intangibles affecting performance are concerned. Mechanical tests are frequently useful to indicate uniformity and occasionally to predict performance. However, in the majority of cases, no mechanical test can take the place of actual trial in the operation for which a wire is intended.

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Problems in meeting the first part of the wire maker's obligation are fairly simple of solution. That is to say that, when some particular item of a specification is not met, the cause is usually found in ignorance, carelessness, defective raw material, or faulty equipment. While not always obvious at first glance, once the cause of a difficulty such as this has been traced, its elimination readily follows from correction of defects, practice change, tightening of quality controls, and similar measures.

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Under the second obligation—to furnish suitable characteristics of the wire for the job intended—more serious problems are often posed. In many cases, poor performance has been evident and yet all the elements of the specification have been met. This simply means that the specified details are not sufficient to control the necessary properties, or that the properties themselves have not been established at the right level. The real causes of such trouble are seldom clearcut, and often are extremely difficult to pin point. There are probably just as many case histories of such difficulties that show indirect effects of factors in the user's operations to be the cause, as there are cases in which some obscure element in the wire practice carries thru to make trouble.

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As a matter of common sense, the wire user has a certain responsibility for the type and condition of the equipment used to fabricate the wire. He may feel that the equipment is in first-class condition when actually it may be questionable, or he may have made some changes without realizing their effect on wire performance. Considerable diplomacy is often required in the approach to such problems in order to get the facts, and frequently much co-operation between user and producer is necessary to reach the solution.

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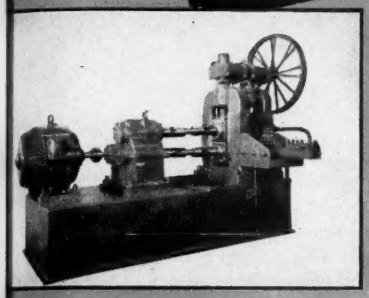
Several phases of the problem must be considered, among them questions concerning the type and mechanical condition of the machinery involved, the suitability of the particular grade of wire ordered to the particular method or equipment used, and even the knowledge and ability of the personnel working with the wire. An arbitrary stand that the wire is exactly as ordered and the producer therefore washes his hands of the matter benefits no one, least of all the producer. On the other hand, a blind replacement of the material in question puts the wire mill at the mercy of sheer luck whether the new lot works any better. Actually, thru co-operation, a thorough study of the problem, leading perhaps in one case to a change in wire grade, in a second to modification of tools, or even in a third, to explanation of a sensitive adjustment to operating personnel, is after all only the ful-

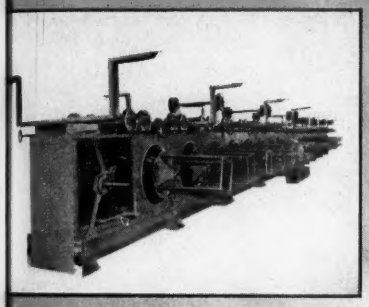
(*Please turn to page* 669)

LOOK TO Wean FOR WIRE MACHINERY

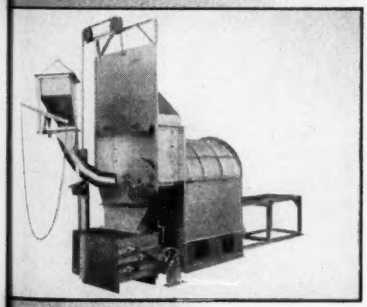
Process OR *Product*



2—Hi Wire Flattening Mill



Wire Galvanizing Take-Up Frame

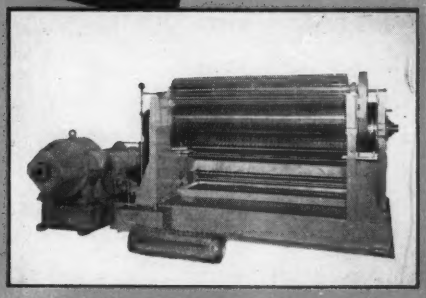


Nail Galvanizing Unit

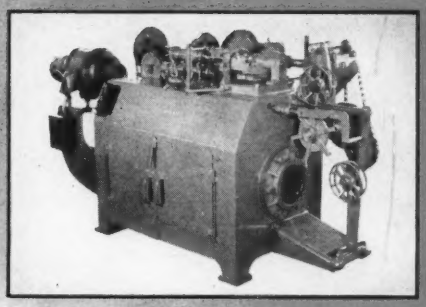
In the past few years tremendous progress has been experienced in the field of wire machinery. Production speeds have been tripled and quadrupled. Product quality has been greatly improved. Machines have been made easier to operate and maintain.

The Wean Equipment Corporation has been a large contributor to this advancement. Wean wire mill specialists have designed, built, and installed wire mill equipment for the leading wire producers the world over. If you make wire you should look to Wean for the best in machinery, service, and facilities.

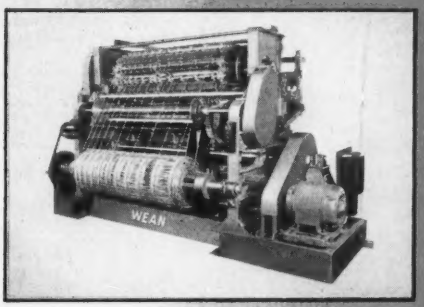
STRIP MACHINERY



Hexagon Netting Machine



2 or 4—Point Barbed Wire Machine



Hinge — Joint Fence Machine

Wean Equipment Corporation
CLEVELAND, OHIO

Observations on the Effects of Pre-Plating Hot Galvanized Steel Wire

by

H. H. Passolt, Chief Metallurgist

Johnson Steel & Wire Company

Worcester, Massachusetts

and

A. T. Baldwin, Manager of Flux Sales

Hanson-Van Winkle-Munning Company

Matawan, New Jersey

The ductility and adherence of hot galvanized coatings on steel wire are important factors in the success of processes used to reduce the diameter or change the cross section of such wires. Drawing to smaller diameters and rolling hot galvanized wire to rectangular cross sections are frequently practiced in this country. Experience has shown that the temperature of the molten zinc and the actual immersion time of the wire in the zinc bath are important influences contributing to success in these form changing treatments.

★ ★ ★

Broadly, the nature and amount of the layers of zinc-iron alloys are looked upon as controlling factors influencing coating ductility and adherence. Thicker layers of these alloys are felt to be less adherent. Galvanizing methods which create few alloy crystals attached to the basis steel yield coatings with highly desirable forming qualities. One writer, Hughes*, takes the position that adherence as judged by flaking of the hot galvanized coatings is determined by the thickness of the pure zinc or Eta layer. This conclusion is based on the observation that flakes consist of the Eta and attached alloy layers and not the Eta layer alone. Also if there is little or no Eta layer, a coating may fracture but not part from the basis iron on distortion of the coated wire or sheet. The experiments now to be described were undertaken to coat wire at low temperatures for short periods of immersion. The objective was to create coatings of lesser zinc-iron alloy content that would permit satisfactory re-forming of the hot galvanized wire.

★ ★ ★

The importance of preventing iron as a residue from pickling or as rust newly formed after pickling being carried along on steel objects into the molten zinc is well understood in all sorts of hot galvanizing. In addition to reducing the production of dross the ductility and adherence of the zinc coatings are improved as a result of proper attention to this detail. The use of a flux wash of some form of zinc ammonium chloride in aqueous solution to create a protecting film on the adequately pickled and rinsed work has proven to be effective. Such flux washes are commonly heated to about 170°/200° F. so that most of their water content will evaporate from the wire surface in the short travel from the flux wash tank to the point of entry into the molten zinc, largely to avoid minor explosions in the molten zinc.

★ ★ ★

The question about whether a zinc ammonium chloride flux film could be heated to temperatures higher than the 200° F. of present practice called for an answer. Under what conditions would such films be altered and the steel surface lose its preferred condition? Would there be advantages resulting from the use of a very thin electroplated film of another metal that would act as an additional protection to the steel surface? Several months ago preliminary experiments using pre-plates of zinc, tin and nickel (Baldwin*) showed that such a step could be introduced and have characteristic zinc-iron alloy coats form. They also brought out strikingly the

Mr. Passolt has spent most of his time since graduating from the University of Michigan in 1925 on problems involving the use and manufacture of wire. He was Development Metallurgist for American Chain and Cable Company for 13 years and Wire Mill Superintendent for the Page Steel and Wire Division for 8 years. Since 1950 he has been Chief Metallurgist for Johnson Steel & Wire Company.

Mr. Baldwin holds the degree of Batchelor of Science in Chemistry, and after activities in research, manufacturing and sales fields of a technical nature, became especially interested in the many problems associated with the preparation and handling of ferrous articles to secure good hot galvanized coatings, and has devoted the last 23 years to this work with the Hanson-Van Winkle-Munning Company.

This paper was presented before the Worcester Regional Meeting of The Wire Association on April 22, 1954.

* M. L. Hughes—The Flaking of Hot Dipped Galvanized Coatings Proceedings, International Galvanizing Conference Dusseldorf, 1952.

* A. T. Baldwin—Electroplating Prior to Hot Galvanizing—Metal Progress—December, 1953.

time required to heat up the work entering the zinc to the point where the molten zinc would actually wet the work surface.

★ ★ ★

This study of the possibilities of pre-plated and flux coated surfaces and of surfaces merely protected by a flux film was undertaken along with pre-heating of the wire as a means of reducing the immersion time in the zinc. The wire selected was drawn from a heat of open hearth steel of the following analysis:

C	0.62%
Mn	0.50%
P	0.010%
S	0.033%
Si	0.17%

★ ★ ★

Two coils of hot rolled #5 Rod were patented, cleaned and coated and drawn 3 drafts to 0.135″ diameter. The 0.135″ wire was air patented, cleaned, borax coated and drawn 6 drafts to 0.048″ diameter. The 0.048″ wire had a tensile strength of 242,000 psi. To note any differences in the experiments due to the nature of the wire surface, one coil was retained for experiments on hard drawn wire and the other coil was double lead patented. This wire had a tensile strength of 165,000 psi. and was cleaned and borax coated to prevent oxidation of the surface prior to coating and galvanizing. A number of coils of both the hard drawn and patented wire were then given a very thin electroplate of zinc and of nickel. The zinc plating was done in a cyanide bath at 100 amps. sq. ft. The nickel plating was done in a chloride bath (pH 2.5) at 200 amps. sq. ft. In each case the wire was alkali cleaned and rinsed before plating. The plated zinc coating varied from .000046″ to .000056″ on the hard drawn wire and from .000030″ to .000050″ on the patented wire. With the nickel, coating on the hard drawn wire measured .000050″ with occasional uncoated areas, and on the patented wire the plate was .000030″ with some bare spots.

★ ★ ★

The actual hot galvanizing was carried out as shown in Fig. #1. The procedure was to place a coil of plated wire and a coil of unplated wire of the same type so that they would pass through the various steps simultaneously. The important steps in the process were:

1. **Pass wire through a hot (200°F) Flux wash of #20 L.F. Flux—10° Baume.**
2. **Pre-heat flux coated wire. (Fig. 2)**
3. **Pass wire into molten zinc without delay.**

★ ★ ★

Finally the galvanized wire passed through wipes of plugs of asbestos and was quenched in water immediately. Galvanizing was done at a wide range of speeds to vary actual submergence time in the molten zinc. We will confine this report to the results obtained for the longest and shortest times of immersion—that is 2.24 seconds and 0.97 seconds. The preheater is shown in Fig. #2 where the wire in passing through the central tube was heated by radiation in a non-oxidizing atmosphere. No inert gasses were used to prevent flux film destruction and consequent rusting on the wire. Since the form of zinc ammonium chloride used in #20 L.F. Flux does not begin to decompose until a temperature of 640° F. is reached we desired to keep the pre-heated wire temperature below this point. The slowest wire speed was 2.23 ft. per second and the fastest was 5.13 ft. per second and at these speeds the pre-heater functioned satisfactorily.

★ ★ ★

All lots of galvanized wire had a uniformly high lustrous finish. There were a few lots with roughened surfaces caused by the wipes "pulling out" or an occasional contact by the wire with the luminous heating tube. The results shown in Tables #1 and #2 are typical of all lots run. We endeavored to maintain a zinc temperature of 820° to 830°F. in a kettle containing Horsehead: Special Zinc, from which dross had been removed just prior to the running of these tests. With regard to the nature of the coatings, the weights were obtained in one laboratory by stripping lengths of wire approximately 18″ long. The thickness measurements were made in a second laboratory, and are the average of five measurements of sections, so that it is not in order to attempt to correlate these two sets of data. Since the wire was asbestos wiped, coating thickness probably is determined more by wiping than by any actual reaction between the wire and the zinc

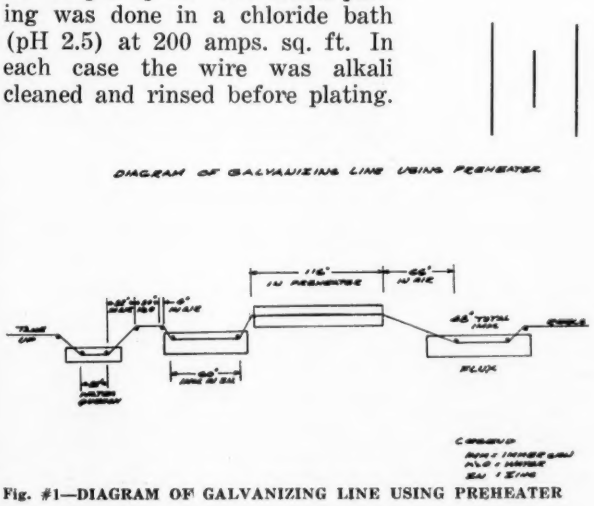


Fig. #1—DIAGRAM OF GALVANIZING LINE USING PREHEATER

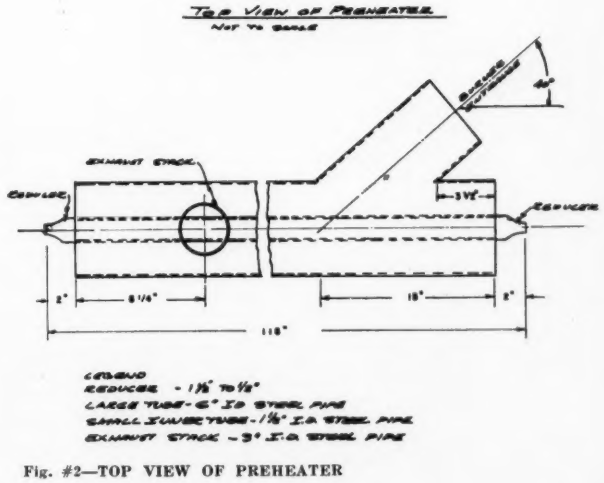


Fig. #2—TOP VIEW OF PREHEATER

TABLE #1

HARD DRAWN WIRE — .048" DIAMETER DATA

PRE-PLATE	IMMER. TIME SECONDS	TEMPERATURES OF ZINC BATH	PRE-HEATER	ENTERING WIRE	COATING WEIGHT GMS/SQM	COATING THICKNESS AS GALV.	COATING THICKNESS AFT. ROLLING*	TENSILE STRENGTH PSI
NONE	2.2	820	1430	550/600	20.3	0.00015	.00009	235,000
"	0.97	820	1400	- 400	9.0	0.00010	.0001	236,000
ZINC	2.2	830	1500	550/600	16.6	0.00016	.00014	231,000
"	0.97	830	1300	- 400	12.2	.000095	.00008	238,000
NICKEL	2.2	840	1450	600	12.9	.00013	.00011	231,000
"	0.97	820	1400	500/550	33.3**	.00010	.00007	234,000

*ROLLING - .048" dia. wire was drawn 2 passes to .039 and then flat rolled 1 pass to .060 x .020

TABLE #2

		PATENTED WIRE			.048" DIAMETER DATA		AFT. DRAWING*	
NONE	2.2	820	1400	450/550	16.1	.00014	.00009	168,000
"	0.97	820	1400	- 400	43.2	.00012	.00006	168,000
ZINC	2.2	820	1400	450/500	16.6	.00015	.00009	161,000
"	.97	820	1400	- 400	14.7	.00012	.00006	168,000
NICKEL	2.2	830	1500	550/600	13.5	.00017	.00007	168,000
"	.97	830	1460	- 400	44.2**	.00011	.00007	168,000

*DRAWING - 6 drafts to .022 diameter.
** WEIGHT - High values due to uneven coating caused by asbestos wipe pulling out.

WRAP (1 DIAM) TEST GAVE "GOOD" RESULTS FOR ALL LOTS.

ALL THICKNESS MEASUREMENTS ARE THE AVERAGE OF FIVE MEASUREMENTS AT 1000x ON THE VICKER PROJECTION MICROSCOPE.

TEMPERATURE OF ENTERING WIRE MEASURED APPROXIMATELY BY USE OF THERMISTIES.

Table #1—HARD DRAWN WIRE—.048" DIAMETER DATA
Table #2—PATENTED WIRE—.048" DIAMETER DATA

itself. Looking at all of the tests, however, there is an impression that the coating thickness generally was thinner with shorter immersion time.

★ ★ ★

An examination of the surface of the wire as galvanized, and in particular after drawing and rolling, shows some physical changes. With the drawn wire the surface has a sort of mottled appearance which resembles very closely that of hot galvanized pipe which has had its excess zinc removed by air wiping. These do not seem to be actual surface fractures, but simply are mottled spots.

★ ★ ★

With the rolled wire there are a number of apparent lines at right angles to the direction of rolling, and even at 1000 diameter it is impossible to determine whether these short dark lines represent actual fissures in the surface or are slight irregularities which might be roll marks and have light reflections of a different type. In view of the tenacity of the coatings and the obvious lack of any peeling it is assumed that these markings do not represent actual fractures.

★ ★ ★

Micrographs of the various lots of wire reported in Tables #1 and #2 have been prepared and the character of coatings is shown in Plates 1 to 5 inclusive. These micrographs were all taken at 2,000x using oil immersion, and unfortunately even at that magnification clear and accurate pictures of actual crystal structure could not be detected by camera or by the eye of the observer. The bottom or smooth surface below the film of coating is the basis wire, and above the coating is a highly marked area which is the electroplated copper applied to protect the film in preparing the specimens. All micrographs show a light area adjoining the steel, then a dark area and a final light area adjoining the copper protection. This second light area we assume to be Eta or pure zinc. The other light area adjacent to the steel does not show any evidence of structures similar to those obtained in the typical crystal series of galvanizing in this same relative position. We are assuming that the darker portions appear similar because their surfaces reflect light differently, and probably are areas of diffusion between the two light areas, but just what the crystal shape might be is

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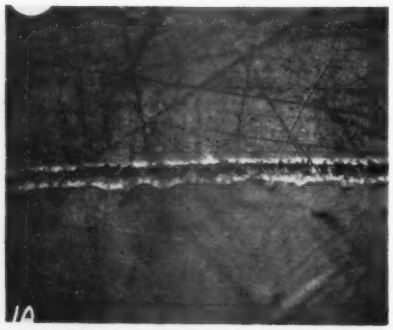

PLATE #1 A-Hard Wire—No Preplate—1.7 sec. Immersion

PLATE #1B-Patented Wire—No Preplate—2.24 sec. Immersion x2000

PLATE #2A-Hard Wire—Zinc Preplate—A-2.24 sec. Immersion x2000

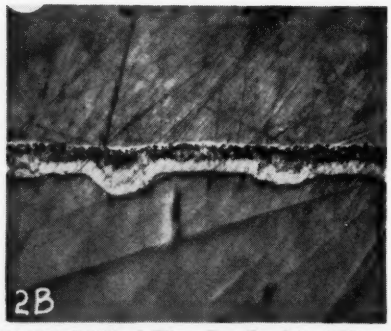

PLATE #2B-Hard Wire—Zinc Preplate—0.97 sec. Immersion x2000

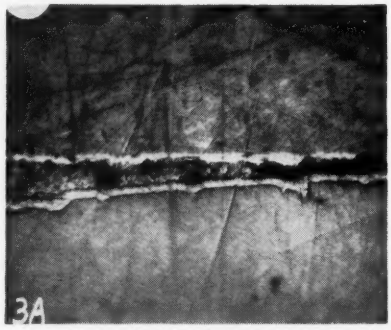

PLATE #3A-Hard Wire—Nickel Preplate—A-2.24 sec. Immersion x2000

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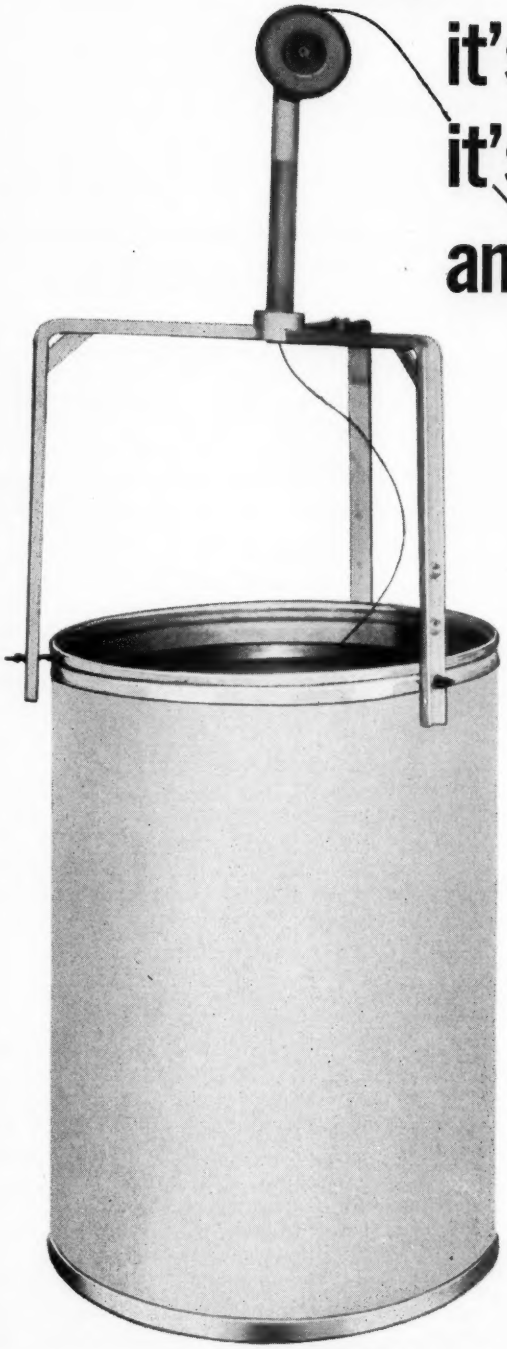

PAYOFFPAK—Continental's newest fibre container—offers wire manufacturers and fabricators a revolutionary new development in wire packaging, handling and dispensing.

SAVES WORK—Wire is automatically packaged in the Payoffpak as it is drawn, eliminating such operations as stripping, tying, handling, splitting and wrapping.

SAVES TIME—Payoffpak can hold 600 lbs. Downtime on the wire drawing machine, due to stripping operations, is greatly reduced.

ELIMINATES REELS—Single standard-size Payoffpak eliminates reels and need for wide range of block sizes.

CUTS SHIPPING COSTS—Inexpensive, light-weight Payoffpaks travel for less because of extremely light tare weight.

HANDLES AND STACKS EASILY—In-plant handling of Payoffpaks is easy with conventional hand trucks. High stacking strength means you can use maximum storage space, too.

A survey indicates that often more than 50 labor steps are needed to convert 500 pounds of steel wire in standard eight inch coils—but you can do the same job with Payoffpaks in an average of five operations. No wonder they are calling this new container "the long-playing record of the wire industry" See how Payoffpaks can pay off for you. Call Continental for complete information on this exciting new way to package, handle and dispense wire.

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"Hypalon"[1] Chlorosulfonated Polyethylene— A New Material for the Wire and Cable Industry

by F. W. Keeley and I. D. Roche
Rubber Chemicals Division
E. I. du Pont de Nemours & Company
Wilmington, Delaware

"Hypalon" chlorosulfonated polyethylene, a relatively new elastomeric material, meets many of the requirements for wire and cable insulations and jackets. This new polymer is made by treating polyethylene with chlorine and sulfur dioxide. The chlorine is substituted along the hydrocarbon chain, and the sulfur is combined with chlorine and attached to the chain as sulfonyl chloride (SO_2Cl) groups. There is approximately one chlorine atom for every six or seven carbon atoms and one sulfonyl chloride group for every one hundred carbon atoms. Substitution is believed to be random.

★ ★ ★

The development of "Hypalon" from a laboratory curiosity to a commercially available material has covered a period of approximately nine years. Although "Hypalon" is considered to be a "new" product, "Hypalon" compositions have been undergoing long-term aging for several years. The favorable results obtained from many of these tests were the determining factor in the decision to market this new elastomer.

★ ★ ★

"Hypalon," being an elastomer, requires the incorporation of vulcanizing agents and activators for curing. It can be vulcanized with a combination of metal oxides, accelerators and organic acids. The curing process involves the cross-linking produced by the reaction of the sulfonyl chloride groups with metal oxides in the presence of an organic acid and an accelerator.

[1]"Hypalon" is a registered trade mark of E. I. du Pont de Nemours & Company, Inc., Wilmington, Delaware.

F. W. Keeley

Mr. Keeley received a BS degree in chemistry from Henderson State Teachers College, Arkedelphia, Arkansas, in 1935. He taught mathematics and science in high school before entering the industrial field. He was associated with the B. F. Goodrich Company for eight years, after which he was superintendent of the Jasper Rubber Company. At present, he is a research chemist in the Rubber Laboratory of the E. I. du Pont de Nemours & Company, where he is investigating the technical aspects of the application of "Hypalon" to the wire and cable industry.

Mr. Roche received a BS degree in chemistry from Bethany College in 1942 and an MS degree in chemistry from Bucknell University in 1948. He was associated with the Carbide and Carbon Chemicals Company for four years and then spent a year in the U. S. Army before joining the E. I. du Pont de Nemours & Company. For the past five years, he has been engaged in research on "Hypalon."

Mr. Keeley presented this paper at the Worcester Regional Meeting of The Wire Association on April 22, 1954.

Processing of "Hypalon"

Standard rubber machinery is satisfactory for processing "Hypalon" compounds. Mill and Banbury mixing are both applicable to "Hypalon." Short Banbury mixing cycles are possible because the polymer requires no breakdown before the incorporation of pigments.

★ ★ ★

"Hypalon" can be extruded with conventional rubber extruders and has been successfully extruded onto wire and cured in factory CV machines. Excellent cured properties can be obtained in less than a minute in the continuous vulcanization operation. In a factory trial, a 3/64-inch thickness of "Hypalon" was applied to a #14 AWG conductor at rates of 150 to 350 feet per minute using a 165-foot tube at 200 psi steam pressure (388°F.).

Properties of "Hypalon" Vulcanizates

The physical properties of vulcanized "Hypalon" compounds vary considerably depending upon the type and quantity of fillers and extenders. However, in contrast to some synthetic elastomers which require reinforcing filler for good physical properties, "Hypalon" vulcanizates containing no filler have excellent physical properties. Table I shows a range of physical properties which can

TABLE I

Physical Properties of "Hypalon" Compounds

Tensile Strength, psi	Up to 3000
Elongation at Break, %	200 to 500
Hardness, Durometer Shore A	60 to 95

be obtained with properly compounded "Hypalon."

★ ★ ★

The electrical properties of "Hypalon" are intermediate between those of natural rubber and neoprene. Table II shows the values obtained with a typical insulating compound. It is obvious from the values shown for power factor and dielectric constant that the use of "Hypalon" as an insulation would be restricted to relatively low frequencies. This, of course, limits its value as an insulation in communication work, with the possible exception of short lengths at the lower frequencies. On the other hand, the relatively good insulation resistance and dielectric strength indicate that "Hypalon" should find some application in the power distribution field at low to intermediate voltages. "Hypalon" should be of particular interest as an insulation at relatively high temperatures as judged by the good retention of electrical properties at 125°C, shown in Table II.

TABLE II

Electrical Properties of "Hypalon"

DC Resistivity, ohm-cm	1×10^{14}
Specific Inductive Capacity, 1000 cps	6
Power Factor, 1000 cps, %	2.1
Dielectric Strength (0.075-inch slab), volts/mil	551
Surface Resistivity, ohms	1×10^{13}
Specific Insulation Resistance (K at 60°F)/1000 feet	22,000
Insulation Resistance of 3/64-inch Insulation over #14 AWG at 60°F, megohms/1000 feet	5600
Specific Inductive Capacity after Immersion in 70°C Water	
Increase after 14 Days' Immersion over 1-Day Value, %	3
Increase after 14 Days' Immersion over 7-Day Value, %	1
Electrical Properties at 125°C	
DC Resistivity, ohm-cm	2.3×10^{11}
Specific Inductive Capacity, 1000 cps	5.3
Power Factor, 1000 cps, %	3.6
Dielectric Strength, volts/mil ("short time")	500

TABLE III

Heat Resistance of "Hypalon" Compositions

Oven Aged at 257°F (125°C)

	Original	7 Days	28 Days	42 Days	60 Days
Tensile Strength, psi	1560	2060	2185	2125	1710
Elongation at Break, %	555	325	290	160	95

Oven Aged at 302°F (150°C)

	Original	1 Day	2 Days	5 Days
Tensile Strength, psi	1560	1975	2225	2450
Elongation at Break, %	555	365	330	230

The heat resistance of "Hypalon" is noteworthy, as determined by air pressure heat tests at 80 psi and 260°F. and by oven aging at temperatures up to 302°F. Table III shows the effect of oven aging on the physical properties of a "Hypalon" composition compounded specifically for heat resistance. This particular compound contains some water sensitive materials and is not recommended for use in wet locations. Even after 60 days' exposure at 257°F., a particularly severe test of heat resistance, the compound retained sufficient elongation and flexibility for further use as a covering for wire. After 5 days at 302°F., a large percent of the original elongation was retained, and this suggests that "Hypalon" should be suitable for intermittent use at temperatures as high as 300°F. Further compounding studies will undoubtedly result in compounding techniques which will produce a degree of heat resistance even higher than that shown in Table III.

★ ★ ★

Resistance to ozone cracking is a desirable property in any material used in wire and cable construction. It is of importance not only in high voltage cable where relatively high concentrations of ozone can result from corona discharge, but also in any cable which is exposed to the atmosphere. "Hypalon" vulcanizates are especially resistant to damage as a result of exposure to ozone. Some idea of its resistance to ozone is given by the fact that "Hypalon" gaskets are currently being used in ozone generators where the concentration of ozone is at times greater than 10,000 parts per million. The inertness of "Hypalon" to ozone has naturally suggested its use in blends with elastomers such as GR-S and natural rubber, both of which are sensitive to traces of ozone. Experience to date has shown that a large measure of ozone resistance is realized with such blends when approximately 50% of the elastomer is "Hypalon."

★ ★ ★

The weather resistance of properly compounded "Hypalon," as judged by several years' exposure in Florida and Delaware, is extremely good. Not only is it unaffected by the ozone in the atmosphere, but it also shows no evidence of crazing or chalking. For the long-term weathering resistance required in cable jackets, optimum results are obtained by including pigments in the compounds which make them opaque to ultraviolet light. The carbon blacks are especially effective, but good results are also obtained with selected pigments of various colors.

★ ★ ★

Stocks with very low water absorption can be obtained with "Hypalon." The data presented in Table IV show only minor increases in volume and weight of a "Hypalon" compound after it had been soaked in boiling water for 70 hours.

★ ★ ★

For best water resistance, it is essential that the compound be given a tight cure and that pigments which promote water absorption be omitted. The water pickup of properly compounded and cured "Hypalon" has been found to be less than 20 milligrams per square inch after immersion in tap water for 7 days at 70°C.

★ ★ ★

The corona resistance of "Hypalon" is presently under investigation; however, tests to date indicate that it has a high degree of resistance to corona cutting.

Samples of "Hypalon" insulated wire have been subjected to a corona test consisting of wrapping the wire around a mandrell with a diameter 6 times that of the wire and applying 15,000 volts between the conductor and the grounded insulation. The voltage gradient was 370 volts per mil, and the "Hypalon" insulation was unattacked after 8 hours' exposure. A common corona test used by many utility companies consists of exposing a 3/64-inch wall of insulation to 4800 volts until failure. "Hypalon" insulated wire is still performing satisfactorily in this test after over 5000 hours' exposure at 120 volts per mil. Specifications for materials now used require a minimum of 4000 hours before failure.

★ ★ ★

The abrasion resistance of "Hypalon" compositions is of sufficiently high magnitude to recommend its use in many applications where this property is a primary consideration. "Hypalon" compounds have a relatively low coefficient of friction against most surfaces, and it is expected that this factor will contribute materially to its life expectancy in such applications as jackets for tree wire. Good abrasion resistance is realized with compounds which do not contain a filler loading, and also with compounds which are brightly colored. This should be of special interest where a combination of color and long wear is desired. Maximum abrasion resistance, as with the other elastomers, is obtained when reinforcing carbon blacks are included in the compound.

★ ★ ★

The compression cutting resistance of an insulation is indicative of the physical abuse a wire or cable covering will take before it shorts out. A 2-inch section of "Hypalon" coated wire gave a compression cutting value of 4500 pounds on a 0.1-inch thickness of wire at 80°F. and 1400 pounds at 158°F. before failure. Such values indicate that "Hypalon" should give satisfactory service as a jacket for portable cable to be used where severe abuse is encountered.

TABLE IV

Effect of Immersion of a "Hypalon" Compound in Boiling Water for 70 Hours

Compound No.	M-727
Tensile Strength, psi	
Before Immersion	3055
After Immersion	2450
Percent Change	-20
Elongation, %	
Before Immersion	255
After Immersion	205
Percent Change	-20
Change in Weight, %	+1.1
Change in Volume, %	+0.13

"Hypalon" is an oil resistant polymer which is somewhat less resistant than neoprene. However, "Hypalon" has unusual resistance to acids, alkalies and strong oxidizing agents. It is particularly resistant to chromic acid, nitric acid, sulfuric acid, chlorine dioxide, sodium hypochlorite and pickling solution.

★ ★ ★

The colorability of "Hypalon" is one of its outstanding properties. Very bright, deep hues of many colors can be produced with "Hypalon" compounds. These brightly colored compounds exhibit excellent retention of color after prolonged outdoor weather aging. This property promises to be of special interest to manufacturers for applications where sales potential depends upon "eye-appeal."

Suggested Applications as Wire Covering

The many desirable physical, electrical and chemical properties of "Hypalon" indicate that it will be satisfactory as a wire covering in many applications. Some of the more obvious applications for "Hypalon" as a wire and cable covering are discussed in the paragraphs following.

★ ★ ★

"Hypalon" compositions should prove of interest as a replacement in many applications for both insulation and jacket. They have adequate electrical properties to serve as an insulation for many applications and, at the same time, possess the combination of toughness, chemical resistance, and weather resistance which is required in a jacket. The application of a single all-purpose wire covering would obviously involve lower factory handling costs than the application of two separate coverings. Among the end uses where "one-shot" "Hypalon" coverings are worthy of consideration are ignition wire, telephone wire and tree wire.

★ ★ ★

With increasing emphasis on the economies resulting from higher operating temperatures, there is considerable interest in any new material which has a large measure of heat resistance as well as other desirable properties. "Hypalon" compositions merit attention in applications where further increases in temperature rating are restricted by the inadequacy of existing materials. Typical of such applications are insulation for appliance wire and motor lead wire, and as an insulation jacket on automotive ignition wire.

★ ★ ★

Colored telephone handset cord and fixture cord present other

(*Please turn to page* 689)

Opinion vs Fact In the Wire Industry

by Axel U. Sternlof
Division Product Engineer, Quality Control
Electrical Cable Division
American Steel and Wire Division
United States Steel Corporation
Worcester, Mass.

In the past all of us have seen demands made on industry coming from a buyer's market or from a seller's market. At one time you could dispose of almost anything at a fair price; at another you could scarcely dispose of the best product you ever made.

★ ★ ★

The present day demands are changing and these demands are causing industry to change its manner of thinking. Today the application of statistics to industrial manufacturing processes is fast coming into its own as an extremely valuable tool to enable management to better control its quality of product at great savings in scrap and re-works.

★ ★ ★

Past inspection concerned itself with culling out the bad pieces from the good. Today with quality control we are catching defects at the source, frequently actually preventing defects from occurring, and thus building quality into our product. The time allotted does not permit a presentation or explanation of the technical details involved, so let us confine our thinking to one or two practical situations.

★ ★ ★

For our illustration let us take an insulated wire and cable plant drawing approximately 500 tons of copper rods into wire each week and making all sorts of products in its many processes. It is a typical job shop, with short runs, frequent set-ups, etc., as are all plants of this type. In the face of present day competition, and cutting all corners to save money, the management hires a trained quality control engineer. He is to report all his findings and make his recommendations through management.

Axel U. Sternlof

Mr. Sternlof is a graduate of the University of Massachusetts and holds a degree of B.Sc in Chemistry and Mathematics. He has been associated with American Steel and Wire since 1928 as a chemist in the Electrical Cable Works. In 1948 he was appointed Division Product Engineer in charge of Quality Control.

His activities in Quality Control include: Senior Member of American Society for Quality Control, a founder of the Worcester section and its former chairman, former National Director of the A.S.Q.C., general chairman of the 6th N.E. Conference on Quality Control and an instructor in Quality Control at Worcester Junior College. He is also an Associate member of the American Institute of Management.

This paper was presented at the Worcester Regional Meeting of The Wire Association on April 22, 1954.

★ ★ ★

With copper wire as the base of all of its products, the wire drawing department is the logical starting point. Fortunately, past inspection records are available, so the engineer picks up these records for the past six months to to see what the performance has been. He finds hundreds of wire drawing sizes from three mils to about one-half inch. As he sorts and classifies these records, he finds a picture developing.

★ ★ ★

On completion of his survey, he sees that, practically without exception, all wire is drawn on the high side of the diameter tolerances. Investigation discloses that the machine operators are paid by weight and consequently they are doing "that which comes naturally"—keeping on the high side of the tolerances for greater weight per spool and thus more money in the envelope. Quality control charts are installed at the machines with standard values set and drawn up from specifications. These charts are explained to the operators and to the supervisors and almost immediately the practice of drawing to the high side of the tolerances stops and comes down to the nominal level.

★ ★ ★

What does this mean to the plant, its management, its investors? Let us take a wire that is to be drawn to the tolerances of .1080″ - .1090″. From the past inspection records, we see that this wire was drawn to an average of .1087″ over a six month period. After quality control comes into the picture we find that this aver-

age has been dropped down and held to .1085", the nominal, or a decrease of but two-tenths of a mil. But translated into dollars and cents, if all the copper went into this size, the annual savings would amount to $48,100. In addition, we must realize that there is improvement in the products with better centering, and consequently less rejections because of low minimum wall thickness. So you see that there is actual gold in the industrial mine if you want to dig it out.

★ ★ ★

Let us take another case. Here we have an insulated cable made up of several separately insulated stranded conductors and made into extremely long lengths. The specifications call for a stranded bare conductor to be between the tolerances .0351" and .0369" or with a nominal of .0360". Inasmuch as this is an extremely important product with a great deal of money involved, the engineer begins by checking the diameter of the bare conductor strand. To his amazement he finds the diameter running over .0370" consistently. Here is a good opportunity for the engineer to show what quality control can do. The investigation begins with the specifications and the standard practice. The specifications call for a seven wire strand to be made up of individual wires drawn to a nominal of .012".

★ ★ ★

The standard practice is next on the list to be checked and he finds the drawing tolerances are listed as .0122" - .0123". On inquiry he ascertains that these tolerances were set high by the product engineers to take care of "pull-down" in subsequent manufacturing operations. These tolerances as originally set for "pull-down" were established to be in error by the consistent production of oversize strand. I wish to emphasize here, that I am not critical of chemists, engineers, or inspectors as I have been through all these classifications and I know what they have to contend with. In the past, engineers, chemists, etc., sometimes based their opinions on a few tests or trials and, not being aware of quality control, may have arrived at some false conclusions. So to get back to our seven wire strand again. Here comes the quality control engineer with data from hundreds of strands with the recommendation that the drawing tolerances of the individual wires be dropped from .0122" - .0123" to .0119" - .0121". The engineer's recommendations were adopted with a savings of 4.22% in copper alone.

★ ★ ★

Were the output of this plant to be in this one product alone a money savings in copper of over $500,000. yearly would result with further savings in insulation materials with great improvement in the product. So you see that facts put money in the bank—opinion shoots it down the drain.

★ ★ ★

Allow me to present a quality control chart depicting in graphical form the comments that I have made on this strand. You can get a better idea of what was actually accomplished on this one problem by seeing the chart.

★ ★ ★

May I now attempt to explain the fundamental principle underlying quality control charts. How many times have you sat around a table, cigar in your mouth, playing poker with friends, and after discarding, you find you failed to fill a flush, a straight, or a straight flush. Strangely enough, the law that governs your chance of success at cards, dice, etc., is the basic principle underlying quality control charts. It is the law of probability. By means of statistics we calculate the control limits and when a process is operating so that all the points plotted, fall inside these limits we say that the process is operating in control. From this same law, we know that three times out of a thousand we can expect a point to fall outside of these limits due purely to chance and not to any assignable cause. However, in industry we should investigate immediately any point outside the limits as its presence there may be due to some assignable cause and the condition can be corrected.

Control charts are useful in predicting trouble in a process even before it actually occurs. For example, referring to the charts on the strand again: When a process is operating such as this, or in a state of satisfactory control in comparison with the specifications, we can then adopt so-called standard values for center or average line with limits properly calculated based on specifications which in this case would be the tolerances and not what the process had been doing in the past. When standard values are adopted the quality control engineer must be alert for trends, out of control points and signs or warnings of impending danger as shown by the charts. Seven points in succession on the same side of the average or central line is an indication that a change in process level is taking place. If the operation is interrupted at this stage, the occurrence of defects will be prevented if the correct adjustments are made.

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From what has already been said and from the control charts, I believe you have gathered that there is a difference between ordinary inspection and quality control. Inspection concerns itself merely with the question "Does this piece meet the standard requirements?" Quality control goes further than this. Variations are found in everything and it is these variations that are studied by the quality control engineer. From these variations he calculates the process average level and his control limits within which limits practically all his points will fall if the process is operating in a state of control.

★ ★ ★

There is a difference in the philosophy or thinking of these two types of inspection. Quality control emphasizes this variation or range that is found from piece to piece or from sample to sample. By concentrating on the process or material, the quality control engineer reduces this spread or range and a more uniform process is the result, with less scrap and re-works. Furthermore, the quality control

(*Please turn to page* 698)

Evaluation of Natural and Synthetic Rubbers For Insulated Wires and Cables

by

Victor Siegfried, Chief Research Engineer

and

Walter G. Dahlstrom, Division Research Engineer

Electrical Cable Division

American Steel & Wire Division

United States Steel Corporation

Worcester, Massachusetts

Victor Siegfried

Mr. Siegfried graduated from Stanford University in 1930 and from the School of Engineering in 1932. He holds an E. E. degree. He taught Electrical Engineering at Worcester Polytechnic Institute from 1933 to 1944. Joined American Steel and Wire Division organization in 1944, and has been in charge of Cable Research and Development since that time. He has been active in high voltage engineering during his entire professional career. He has been a Vice-President and Director of American Institute of Electrical Engineers over a term of six years. He is also a member of American Chemical Society and A.S.T.M.

Mr. Dahlstrom graduated from the Worcester Polytechnic Institute in 1936 with a B.S. in chemistry and in 1938 secured a Master of Science Degree. He has been employed by American Steel and Wire Division since 1940, and since 1948 has headed the Chemical Research Group in the Elec. Cable Division. He is a member of American Chemical Society and A.S.T.M., and has been active in committee work for these organizations. He is well known in rubber circles for his work on synthetic rubber adaptations to wire and cable.

This paper was delivered by Mr. Siegfried at The Worcester Regional Meeting of The Wire Association on April 22, 1954.

Walter G. Dahlstrom

The manufacture of insulated wire and cable has depended for many years and to a large extent on the use of rubber in various forms. With the advent of thermoplastic insulations, a distinct trend toward lower cost materials and constructions is noted, often for special purposes such as control wire, or for communication and high frequency transmission where polyethylene holds sway. However, the backbone of insulation for portable cable and for long-life high-reliability distribution circuits is still rubber, either natural or synthetic.

★ ★ ★

The advent of synthetic rubbers has changed the picture in several important ways. It is the purpose of this paper to evaluate various types of synthetic rubber available today, and to compare them functionally among themselves and with natural rubber, which is far from being superseded for some applications even when unfavorably priced.

★ ★ ★

With the immediate past history of doubling of electric power generation and consumption in this country every ten years, it can be seen that distribution facilities are being hard pressed to keep step. New demands are made for higher loading capabilities on conductors, which means higher operating temperatures for much of our cable. It has thus been imperative to raise the generally allowable copper temperatures to 75° C, which means that insulations must be readjusted to follow suit. Research has made possible these better insulations, allowing the higher temperature to be permitted by standardizing agencies. Toward this end, the superior aging properties of synthetic rubber insulations have played no small part. Neoprene jackets have also done their share through elimination of much of the need for lead sheath formerly required for protection against moisture. And where lead sheath is required still, neoprene furnishes

the backbone of protective coverings over lead to reduce mechanical and corrosion damage, in turn permitting use of thinner lead. For purposes of this discussion, however, we are concerning ourselves largely with Buna-S or GR-S synthetics as we know them in current parlance.

Synthetic Rubber Development

During World War II, the use of natural rubber was severely restricted, and there came into being a class of chemical rubbers known as GR-S (from the initials of Government Rubber—Styrene type) and GR-I (from Government Rubber—Isobutylene type). The former is the type getting the greatest use for general purposes as well as for insulations, while the latter, Butyl, was and still is used as the basis of inner tubes for tires, and is increasingly prominent in insulations because of good electrical and aging properties. The critical period of the war years required a decision as to which should be the basic synthetic, and the GR-S type won out through greater availability of raw materials. The principal component of GR-S is butadiene, which can be made from either alcohol or petroleum. Styrene, its other component, comes from benzene from either coal tar or petroleum. To complete the historical part of this description, the wartime basic necessity was to protect petroleum products for more essential uses, so that until the war's end, GR-S traced its raw materials from alcohol and coal tar, only today being mainly supplied from petroleum sources as more economical. The development of Butyl suffered from this decision also, since it was wholly dependent on petroleum, and the research into its improvement likewise was frozen. Looking ahead, a need for the good properties in Butyl insulation and improvement in some other points to the necessity of an intensification of work toward better Butyl polymers today.

★ ★ ★

It is pertinent here to discuss mainly the present day polymers rather than trace their development completely. Since all plants producing synthetic rubber have been under the operation and control of the Rubber Reserve of RFC, plant names may be used without commercial significance. All plants were originally modeled on the Naugatuck pilot plant, but with many important differences which will appear below, and all were producing GR-S polymerized at 122°F. As indicated previously, the principal components of GR-S are butadiene and styrene, mixed in a ratio of about 3 to 1, and emulsified in a water solution in the presence of a catalyst. Polymerization ensues, forming floc or crumbs of synthetic rubber. These rise to the surface and are screened off. After washing, the excess water is pressed out, and the material is dried, baled, and bagged. Widely varying properties can be obtained from different ratios of butadiene to styrene. As the butadiene content is increased, the low temperature flexibility is improved, but physical strength and electrical properties are impaired. GR-S for Arctic service would fall into this category. Conversely, as styrene content increases, stiffness is increased along with electrical properties, but flexibility at low temperatures is reduced. Other variations are possible between processing plants using different coagulants, and also differing antioxidants and stabilizers. The number of variations produced to date is about 750, many having become obsolete or of limited usage in the meantime.

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It is also possible to change the properties of the polymer by the temperature of polymerization. So-called "Cold" rubber is produced at 41°F in refrigerated reactors, and is somewhat superior to "hot" rubber for use in tire stocks, particularly, where road wear is the principal and undebatable basis of comparison.

Genesis of Presently Used Polymers

In the early GR-S, made with a salt-acid coagulant, much electrolyte was left in the polymer, giving inferior electrical properties. GR-S 65 was evolved using a glue-acid coagulant and processed at Naugatuck as GR-S 65 SP, with a better washing process to remove more of the electrolyte. GR-S X-361 using an alum coagulant gave the first of the excellent low-water-absorption polymers, later refined in GR-S X-445. This latter polymer was processed in a more dilute solution, as compared with other polymers, lowering its yield along with reducing the electrolyte remnant. While we, along with one other wire and cable insulating manufacturer, would have preferred this as our normal GR-S polymer, its production was a considerable burden to the Government Rubber program, and it had to give way to more economically produced forms of GR-S. GR-S 66SP was introduced as the variant for non-staining synthetic rubber, making possible light-colored compounds. Our company adopted this as its standard GR-S for "hot" rubber. Later its designation was changed to GR-S 1019 irrespective of the plant of manufacture, the Borger, Texas, plant having been equipped for SP finishing substantially the same as Naugatuck.

★ ★ ★

The introduction of "Cold" rubber, mentioned above, brought in a new number, 1503, which this company uses for the slightly higher physicals it permits. Comparisons to follow will refer to this low-temperature polymerized material in contrast with the "hot" rubber.

★ ★ ★

Another variant is in polymers prepared specifically for low temperature flexibility as required for Arctic service. The proportion of butadiene is increased and that of styrene is decreased. The present GR-S 1023, with 87% and 13% respectively, appears to be a reasonable compromise between requirements of flexibility and physical strength. Military specifications requiring flexibility as low as —65°F and with tensile strength of about 600 PSI can be met. To illustrate the tailoring of polymers for specific purposes another polymer found in our operations is GR-S 1018, a special cross-linked polymer, whose inclusion in rubber compounds improves processing

characteristics and smoothness of surface, and reduces shrinkage after vulcanization. Incorporation in amounts up to 15 to 20% of the base polymer is normal. This demonstrates the versatility of synthetic rubbers as contrasted with natural rubber.

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The synthetic rubbers have found their place in wire and cable insulations along side of natural rubber and are preferred in many instances. There are many reasons for this situation, among which are:

1. Greater uniformity of polymer due to closer control of chemical processes.
2. Freedom to vary ingredients for specific purposes.
3. Cleanliness and freedom from contaminants.
4. Less deterioration from water immersion or moisture.
5. Resistance to heat and ozone superior.

★ ★ ★

In periods when price or availability favors one or the other, some of these reasons are unavailing. In general, insulations can be made with either to meet specific dominant requirements. The wire and cable industry is well advised to be aware of the rubber polymer situation and to make its needs known. While this industry is using rubber at the rate of 100,000,000 pounds (1953), which is in the order of 4% of the total rubber consumption of the USA, we have some of the more exacting needs. We should make certain that these requirements are well understood so as to insure a continued supply of suitable polymers.

Processing of Natural and Synthetic Polymers

Mixing of rubber compounds is normally done with an internal mixer, here called a Banbury, in which two rotors shaped eccentrically churn the rubber and other ingredients under pressure of a ram.

★ ★ ★

A comparison has been made of the breakdown characteristics of natural rubber with "hot" and "cold" synthetic rubbers. The study was made in a laboratory Banbury. Temperatures of the mix and power required to turn the mixer were the important attributes, and their changes with time are shown in Figure 1. The temperature rise indicates the stiffness of the rubber, with "cold" rubber being the highest. This is supported also by the power requirements, which remain consistently higher for "cold" rubber. It is interesting to note that Natural rubber requires more power initially but drops faster to prac-

(*Please turn to page* 676)

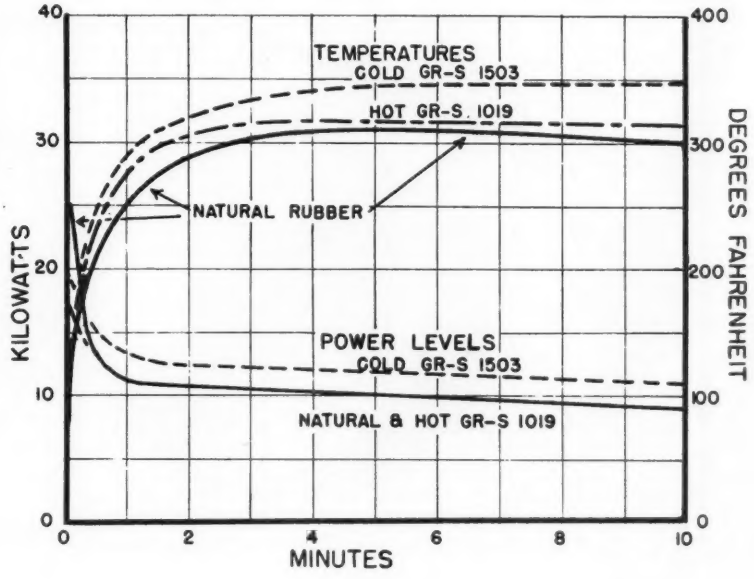


FIGURE 1. COMPARISON OF TEMPERATURES AND POWER LEVELS IN LABORATORY BANBURY

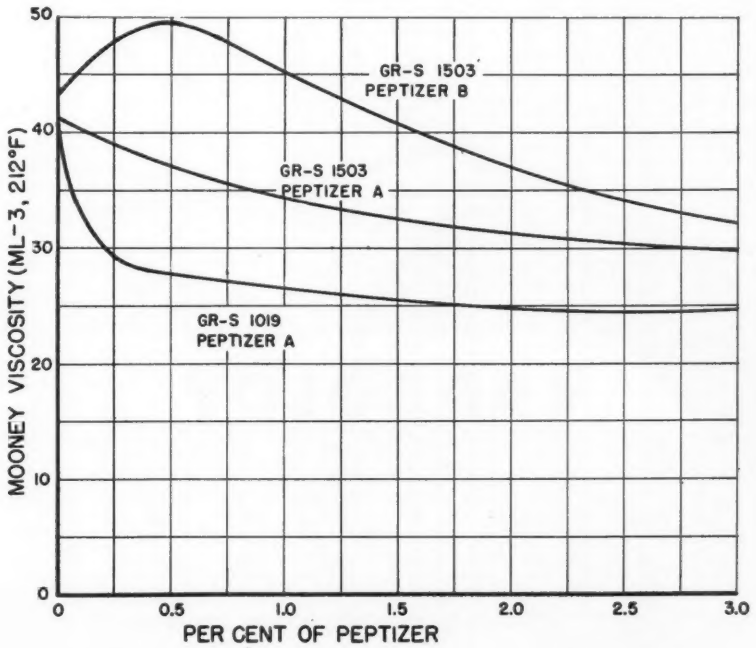
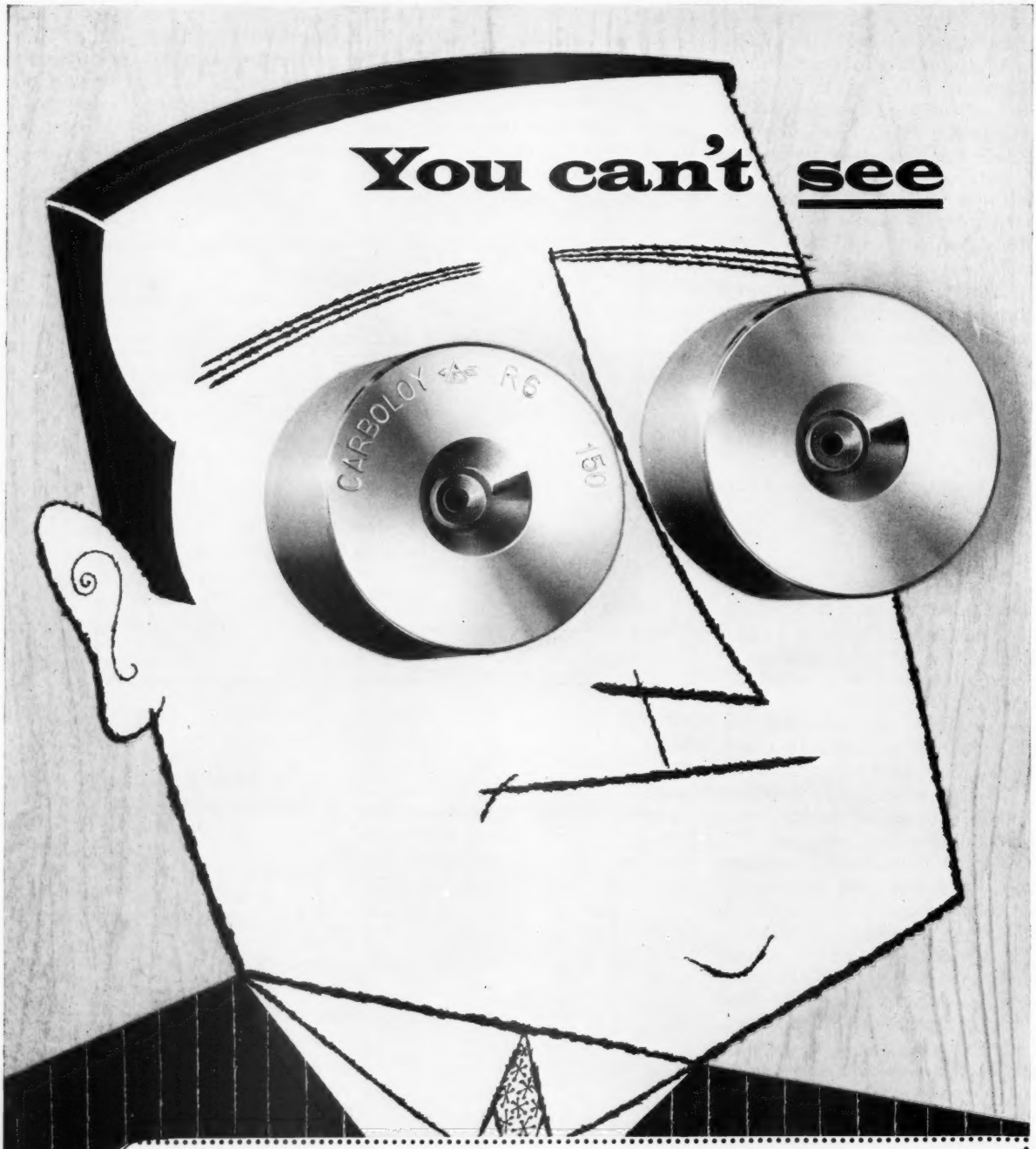


FIGURE 2. PLASTICITY CURVES IN LABORATORY BANBURY. "COLD" VS. "HOT" GRS



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The Worcester Regional Meeting of the Wire Association

by Edmund D. Sickels, Editor
Wire and Wire Products
Stamford, Connecticut

Frequently heard around the hotel lobby as people departed: "Certainly was a fine meeting—it was the best ever."

★ ★ ★

The Worcester Regional Meeting of **The Wire Association,** held on April 22nd and 23rd, 1954, at the Sheraton Hotel in Worcester, Massachusetts, did indeed justify the hard work and the expectations of the Program Committee and the hopes of the officers and directors.

★ ★ ★

The Program Committee was comprised of the following:

CHAIRMAN

Robert C. Peterson, Manager
Thompson Wire Co., Worcester, Mass.

CO-CHAIRMAN

Roger M. Scott
Morgan Construction Co., Worcester, Mass.

FERROUS PROGRAM CHAIRMAN

Joseph R. Carter, Vice Pres., Operations
Johnson Steel & Wire Co., Worcester, Mass.

NON-FERROUS PROGRAM CHAIRMAN

John H. Jewell, Asst. Mgr., Operations
American Steel & Wire Division
United States Steel Corp., Worcester, Mass.

ASST. NON-FERROUS PROGRAM CHAIRMAN

Albert Averill, Vice Pres.
Phalo Plastic Corp., Worcester, Mass.

FERROUS PLANT VISIT CHAIRMAN

Albert Ziegler, Superintendent
Wickwire Spencer Steel Division
Colorado Fuel & Iron Corp., Palmer, Mass.

NON-FERROUS PLANT VISIT CHAIRMAN

Samuel C. Avalon, Metallurgist
Phalo Plastics Corp., Worcester, Mass.

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Frederick W. Leslie, Superintendent
George F. Wright Steel & Wire Co., Worcester, Mass.

BUS ARRANGEMENTS CHAIRMAN

Carl W. Backstrom, Asst. Mgr., Operations
Worcester Wire Works Division
National Standard Co., Worcester, Mass.

PUBLICITY CHAIRMAN

Walter O. Sjogren, President
Sjogren Tool & Machine Co., Auburn, Mass.

★ ★ ★

The members and officers of the Association are greatly in debt to this fine committee for their careful planning of all of the many details of the splendid program presented, the result of which was quadrupled attendance, as compared with the last meeting held in Worcester in April of 1947.

★ ★ ★

The registration desk opened to enroll the members and their guests at 8:00 A.M. on April 22nd. Altogether 415 men registered and some 20 women secured tickets for the special events for the ladies.

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At 10:30 A.M. the semi-annual meeting of the Board of Directors was called to order by President **Leonard C. Crewe.** Director **James E. Flood** recommended that the plan to hold a Non-Ferrous Meeting in Providence in September be dropped, due to its proximity to the date of the Annual Convention; his suggestion was approved.

Awards for 1953

Allan B. Dove, Chairman of the Medal Award Committee announced the selection of the following papers published in Wire and Wire Products in 1953 for awards at the Annual Convention in November: Medal Award for the most meritorious paper to **Vito J. Vitelli,** Process Engineer, Metallurgical Engineering Dept., Steel Wire Mills Division, John A. Roebling's Sons Corp., Trenton, N. J. for his paper "The Drawing of Shaped Steel Wire."

★ ★ ★

For Certificates of Honorable Mention, the Committee selected as the best ferrous paper: "Molten Salts for The Wire Industry" by **Dr. F. R. Morral,** Head X-Ray Dept., Div. of Metallurgical Research, Kaiser Aluminum and Chemical Corp., Spokane, Wash., and **Dr. F. A. Schaufelberger,** Chemical Construction Corp., New York, N. Y., and the best non-ferrous paper: "A Review of Fluorothene in the Wire and Cable Industry" by **F. W. Wurtzell, W. J. Canavan** and **B. H. Maddock,** Development Engineers, Bakelite Company, New York, N. Y.

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Mr. Dove explained that all papers eligible for consideration had been selected by the Oxford Point System, a method of rating the qualities of excellence in papers by which all possibility of personal leanings toward one or another author was eliminated and an evaluation secured that was based on the sheer merits of the papers.

★ ★ ★

A. Earl Glen, General Program Chairman of the 1954 Annual Convention, together with **James E. Flood,** Non-Ferrous Program Chairman and **Ray S. Worth,** Ferrous Program Chairman, reported severally on the status of the pro-

gram, which is now practically complete for the Convention in Detroit in the Fall.

★ ★ ★

The following names were proposed and approved by the Board of Directors for committees for 1954:

NOMINATING COMMITTEE FOR DIRECTORS
L. C. Whitney, Chairman
Benoit J. Sirois
Richard E. Brown

NOMINATING COMMITTEE FOR EXECUTIVE COMMITTEE
John L. Sanderson, Chairman
Fred M. Crapo
Earl R. Potter
Richard E. Brown

NOMINATING COMMITTEE FOR OFFICERS
Carl E. Johnson, Chairman
Robert C. Peterson
E. Ray Snow
Richard E. Brown

★ ★ ★

Executive Secretary Richard E. Brown stated that an invitation to hold the 1956 Annual Convention in Pittsburgh had been received. The matter is to be taken under advisement and decided at the Board's next meeting, in November.

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It was proposed that a change be made in the registration fee (1) to have this cover the cost of the Annual Luncheon and (2) to have a differential of $2.00 in the charge of registering members and non-members. The charge for members would be $11.00 and for non-members, $13.00; each would be given different colored badges to distinguish them, with the word "GUEST" printed on a non-member's badge. This proposal was ratified by the Directors and will be followed at the Convention in Detroit in November of this year.

★ ★ ★

President Crewe announced that the 1954 Annual Convention would be our 25th Anniversary, and plans for a suitable recognition of this "birthday" were discussed and formulated.

★ ★ ★

A plan to issue 25 year membership certificates to those who have been members of the Association for this period was proposed by Secretary Brown and adopted. It will be started at the next meeting and followed each year thereafter.

★ ★ ★

After discussion of other matters of a routine nature, the Directors adjourned for luncheon, where they entertained the Program Committee and the program participants.

The Technical Sessions

At two o'clock, the Ferrous and Non-Ferrous Section meetings got under way with simultaneously held sessions in different rooms.

Ferrous Section Meeting

Wade Houk, General Superintendent of the American Steel & Wire Division of United States Steel Corporation presided as Chairman of the meeting, introducing first **Rodman R. Tatnall,** Field Service Metallurgist, Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., Buffalo, N. Y. Mr. Tatnall's paper, "Manufacturer's Wire," described the two broad categories of steel wire—merchant and manufacturer's, and characteristics and manufacturing techniques required for each.

★ ★ ★

He was followed by **Henry H. Passolt,** Chief Metallurgist for Johnson Steel and Wire Co., Worcester, that had been prepared jointly by him and **Allan T. Baldwin,** Chemical Engineer of Hansen-Van Winkle-Munning Co., Matawan, N. J. The paper, "Observations on the Effect of Pre-Plating Hot Galvanized Steel Wire," described the ductility and adherence of hot galvanized coatings on steel wire with a discussion of how satisfactory coatings can be achieved.

★ ★ ★

The final paper, "Practice and Control for the Manufacture of High Carbon Commodity Wires," was presented by Robert H. Isenberg, Metallurgical Engineer, Pittsburgh Steel Co., Monessen, Pa. In his paper he set forth methods by which his company controls the quality of its wires in the process of manufacture.

Non-Ferrous Section Meeting

This technical session was ably presided over by **Shaw Goldthwaite,** Quality Control Engineer, Collyer Insulated Wire Co., Pawtucket, R. I. who introduced the speakers.

★ ★ ★

F. W. Keeley of the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Wilmington, Del., gave the first paper "Hypalon Chlorosulfonated Polyethylene—a new Material for the Wire and Cable Industry," a paper prepared jointly by him and **I. D. Roche** of the same company. Mr. Keeley described this relatively new elastomeric material, its processing, properties and applications.

★ ★ ★

Following him, **Axel U. Sternlof,** Division Product Engineer, Quality Control, Electrical Cable Division, American Steel & Wire Div., United States Steel Corp., Worcester, gave a paper entitled "Opinion Versus Facts in the Wire Industry." In this masterly presentation, the author told how quality control systems function and pointed out specific savings that had been made in several instances in the Cable Works' experience.

★ ★ ★

Victor Siegfried, Chief Research Engineer, Electrical Cable Works, American Steel & Wire Division, United States Steel Corp., Worcester, made a fine presentation on the subject of the "Evaluation of Natural and Synthetic Rubbers for Insulated Cable," in the preparation of which he had been assisted by **W. G. Dahlstrom,** Division Research Engineer of the same company. Mr. Siegfried pointed out that rubber, natural or synthetic, is still the backbone of insulation for portable cable and distribution circuits, and proceeded to analyse the reasons why. The processing of natural and synthetic polymers was discussed and ways and means of securing different desired characteristics for end uses was presented.

★ ★ ★

The several papers at the two sessions were followed by active

discussions from the floor, indicating that the papers were of great interest and well-received. All of these papers are printed in full elsewhere in this issue of **Wire and Wire Products.**

Hospitality Hour

Through the courtesy of the Morgan Construction Company of Worcester, Massachusetts, a delightful and convivial cocktail hour preceded the banquet. The host was represented by Messrs. **Paul S. Morgan, P. A. Beaman** and **Roger M. Scott.**

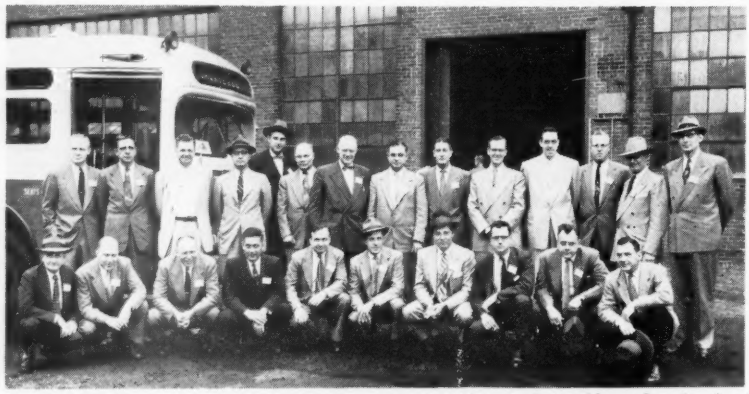
The Banquet

The doors to the festive ballroom were thrown open at 7:00 P.M., the occasion being opened with the singing of the national anthem.

★ ★ ★

After an excellent dinner, President Crewe welcomed the people to the meeting. He declared that the reason for the healthy growth of the Association had been due to its dual purpose of promoting good fellowship within the industry and of serving as a clearing house for information. He expressed the belief that the Association had arrived at a stage in its development where it should consider such questions as the establishment of scholarships, the conduct of research work and the setting up of financial awards for the outstanding papers presented at meetings. He then presented the toastmaster for the evening, **George F. Wright,** President of the George F. Wright Steel and Wire Company. Mr. Wright, a veteran wire man who has seen many changes in wire production practices and personnel, handled his job of presenting the speakers ably and entertainingly.

Group of men at luncheon following the Wickwire Spencer plant visit. * * * * * *



Some of American Steel and Wire's visitors after the trip through their cable works. * * *

★ ★ ★

The first speaker was **Paul S. Morgan,** City Councilman, who represented **Mayor O'Brien** in extending the greetings of the City of Worcester to the gathering. He is also assistant treasurer of the Morgan Construction Company. He expressed his personal satisfaction in having so fine a gathering in Worcester.

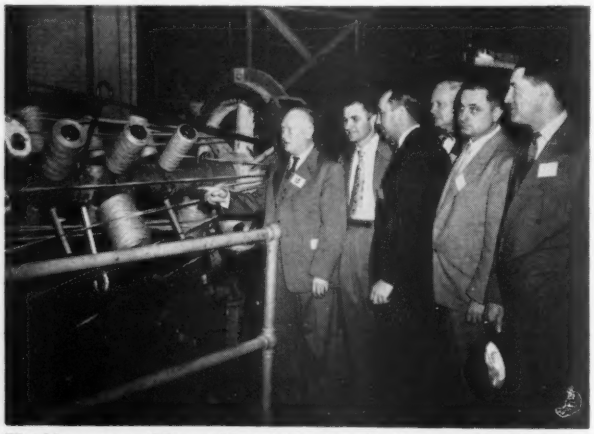
★ ★ ★

Mr. Wright then introduced a man who had started with him in the wire business, **Fritz G. Lindstrom,** now Superintendent of Wickwire Spencer's Palmer Works. After some entertaining "old-time" anecdotes, he extended a personal invitation to all present to visit their works on Friday.

★ ★ ★

Others at the speaker's table in-

(*Please turn to page* 685)



Watching a paper-filler machine at American Steel and Wire's cable works.

Group inspecting a cable-making operation in American Steel and Wire's cable works. * * * * * * * * * * * * * * *

Government Wire Production Information

New Copper Source Arranged

A contract designed to yield 12,000,000 pounds of refined copper for delivery to the Government has been signed with the **Vermont Copper Company, Inc.**, has been announced by **Edmund F. Mansure,** Administrator of General Services.

★ ★ ★

Mr. Mansure said the contract is part of a maintenance of production program originally planned and authorized by the Office of Defense Mobilization in 1953.

★ ★ ★

The agreement provides that the company will produce ore from its "high cost" Elizabeth Mine, located in Orange County, Vermont, and will arrange with a qualified smelter to process the ore.

★ ★ ★

A. J. Walsh, Commissioner of GSA's Emergency Procurement Service, who will administer the contract, said the Government will pay 31.06 cents per pound for deliveries made common carrier's conveyance, Connecticut Valley.

★ ★ ★

Terms of the agreement call for production of 4,000,000 pounds in calendar year 1954, commencing July 1 of this year, and 8,000,000 pounds in 1955. The agreement automatically ends December 31, 1955 or earlier if the full production has been achieved.

★ ★ ★

The Government already has a contract with the Company, signed in April, 1953, calling for the delivery of 8,000,000 pounds of copper from the same mine by June 30, 1954. The price for this material was set at 32 cents per pound. When the current agreement expires, on June 30, 1954 the new contract will go into effect.

GSA to Buy Titanium

General Services Administration has announced that with the approval of the Office of Defense Mobilization it has agreed to buy up to 1,850,000 pounds of titanium metal by June 30, 1954.

★ ★ ★

Agreements have been entered into with **E. I. du Pont & Company** of Wilmington, Delaware, for the acceptance of a maximum of 1,250,000 pounds and the **Titanium Metals Corporation of America** at Henderson, Nevada, for a maximum of 600,000 pounds. Purchases will be made at the market price at time of delivery. The present price is $4.72 a pound.

★ ★ ★

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REGISTERED

MODELS J-3-S and J-4-S AUTOMATIC MICRO-WELD BUTT WELDERS

These welders are used for welding high and low carbon STEEL, and STEEL ALLOY wire, ranging in size from .020" to .160" diameter. All operations on these units, which include the clamping of the wire being welded, contacting the welding switch, and upsetting the weld, are made by a single downward stroke of the foot pedal. Welders for high carbon steel wire are equipped with the exclusive MICRO-WELD Dial indicating annealing device to facilitate the annealing operation of high carbon wire.

Standard equipment with these units include annealing dies, filing vise, light extension cord, and mounting on a 4-wheel truck. Special units can be furnished for crane mounting.

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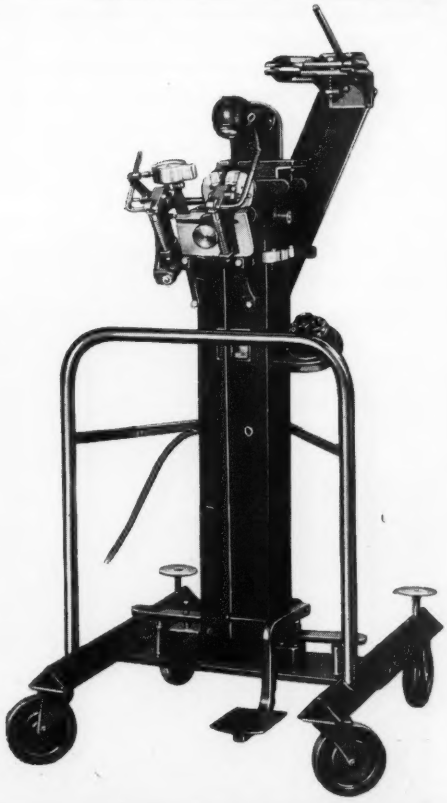

The REEL News is that STEEL Costs Less!

Steel is **DURABLE**
Tests now being conducted indicate a life of 12 times that of wooden reels. Minimum maintenance.

Steel **COSTS LESS**
Although its cost initially is about 30% higher, its longer life results in at least a 400% saving.

Steel **PROTECTS**
The cost of a reel is infinitesimal compared to the value of cable it carries. Drop it, bounce it, handle it roughly. Steel stands up and protects your investment.

Steel is **RUGGED**
Steel reels do not warp, bulk less, carry more payload. Precision made, weatherproof, balanced.

NYECO REELS — SHIPPING REELS *(I-Beam or Channel)* — PROCESSING REELS *Heavy-Duty* — DRUMS and FLANGES *available separately*

Over 45 years of service in metal fabrications

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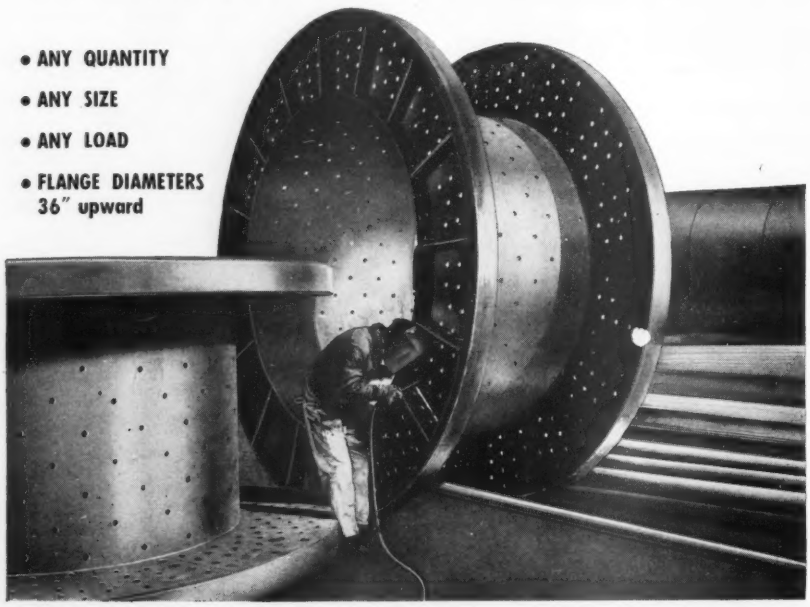
- **ANY QUANTITY**
- **ANY SIZE**
- **ANY LOAD**
- **FLANGE DIAMETERS 36″ upward**



The Office of Defense Mobilization on April 29 authorized GSA to contract with domestic producers for the purchase of titanium sponge which becomes surplus to military or atomic energy requirements. The amount has been set tentatively at 4,000 tons, but may be revised when Department of Defense requirements are reviewed later this year.

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GSA said that in accordance with the ODM directive, when added production is at hand contracts will be made under a general program embracing all producers rather than with individual producers as announced.

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Such contracts will run until December 31, 1960. Under present plans the amount of titanium sponge to be held at any one time by GSA will not exceed 4,000 tons.

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The necessity for purchasing titanium at the present time by the Government arises from the fact that while large quantities of this strategic material is expected to be used by the Air Force, the material has not yet been designed into current production because an insufficient amount has been available.

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Edmund F. Mansure, Administrator of General Services, pointed out that difficulties of this nature frequently arise when new or improved materials become available. Commercial production must await a large and certain supply.

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The material which will be accumulated by GSA will permit the manufacturers to continue production at a time when they are unable to sell all of their output. Also, an additional supply will be available when required.

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The General Services Administration will keep the metal available for resale to industry and it is not expected that it will remain in Government hands for any long period.

★ ★ ★

Both of the companies involved in the agreements recently announced they also have contracts with GSA for the construction of facilities to produce titanium metal. The du Pont agreement calls for the production of 13,500 tons of titanium sponge over a 5-year period. The TMCA contract calls for production of 18,000 tons of sponge over the same period. GSA also has a contract with Cramet Inc., of Chicago, for the production of 30,000 tons of titanium sponge over a 5-year period.

Technical Program Exhibits To Feature ASTM Annual Meeting

The 1954 Annual Meeting will include technical sessions and many committee meetings.

★ ★ ★

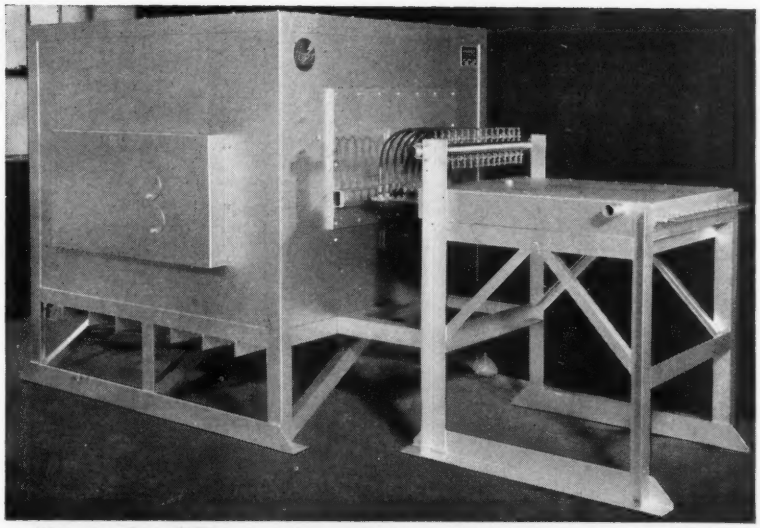
In addition to the six technical symposiums and many other technical papers on the properties and testing of materials that are to be presented at the 57th Annual Meeting in Chicago, June 13-18, the **American Society for Testing Materials** has already scheduled 36 technical sessions. In addition to these there will be in progress throughout the week the Society's Exhibit of Testing and Scientific Apparatus and Laboratory Supplies, and its Photographic Exhibit with the theme Materials, Testing, and Research. Headquarters will be at the Hotels Sherman and Morrison. All exhibits will be at the Sherman, with the entire area air-conditioned.

★ ★ ★

An important feature of the program also will be the Edgar Marburg Lecture, to be given by **Harold F. Dodge,** Quality Results Engineer, **Bell Telephone Laboratories, Inc.** Mr. Dodge, a pioneer and leader in the field of statistics and quality control, will discuss the subject "Interpretation of Engineering Data."

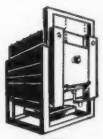
★ ★ ★

Beginning Sunday, June 13, and extending through Friday, June 18, there will be an estimated 600 meetings of the various ASTM technical committees. Several of these committees have cooperated in developing the technical symposiums featuring the ASTM program.



Harper 30 Strand Wire Annealer . . . Models available for research and production

CONTINUOUS BRIGHT ANNEALING OF STAINLESS STEEL WIRE



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HARPER MULTIPLE STRAND WIRE ANNEALING FURNACE

Offers you these advantages

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- ★ Continuous trouble-free round-the-clock production.
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- ★ Savings in valuable floor space. The Harper multiple strand wire annealing furnace is a compact high production unit.
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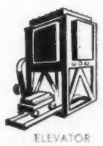

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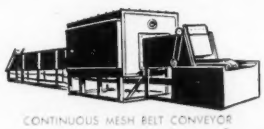
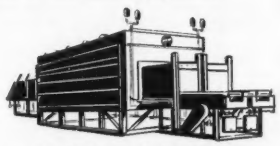
Consider these important savings. They will soon pay for replacement of inefficient or outmoded equipment.



CONTINUOUS MESH BELT CONVEYOR



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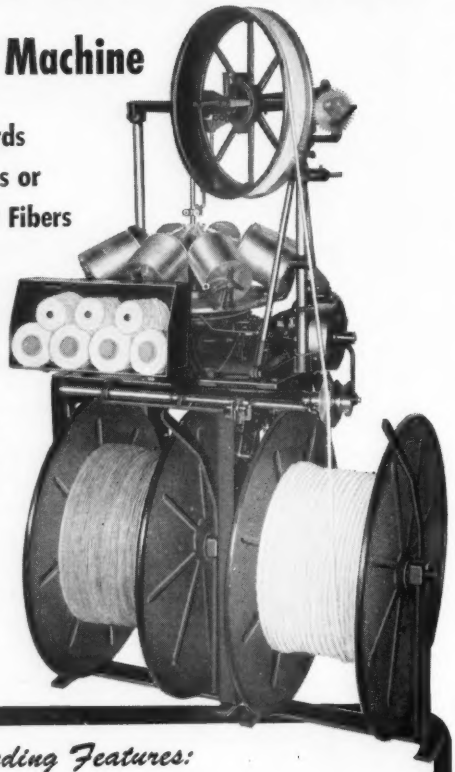
For Insulating Electrical Cords and Conductors with Asbestos or Cotton Roving, Glass and other Fibers



Plain or thread-reinforced asbestos roving, cotton roving, glass and other fibers may be employed as a covering medium.

The machine stops automatically upon exhaustion or breakage of the serving material. Direction of rotation of the supplies may be changed to serve with either a right- or left-hand wrap.

Equipped with adjustable traverse, supply and windup stands and windup driving mechanism.

Outstanding Features:

- Capacity one to eight supply packages.
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- Serving head speed 300 R.P.M.
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- Capstan 18" diameter, 3" face.
- Opening through serving head ⅝" diameter.
- Maximum diameter of conductor covered, No. 4 solid or ½" diameter semi-flexible.
- Supply packages Universal wound, 4" diameter, 4" traverse, on cones 4¼" long, 1⅞" hole at base; three point wind.
- Maximum power requirement ½ H.P. including power transmission equipment.
- Individual motor-drive furnished upon request.
- Stands furnished to take reels as follows:

  30" diameter, 10½"; 13"; or 16" outside width.
- Reels are not included with the machine.

Complete detailed information on "WARDWELLIAN" Type D Serving Machine on Request

There are nearly thirty different applications for Wardwell equipment, including Braiding, Shielding with wire, Tape Serving, Yarn Serving, Asbestos Serving, Paper Serving, Armor Serving and Resistance Wire Serving.

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Report on Visit of the United Kingdom Delegation to U. S. Steel Mills in 1951

A British team visited this country in 1951 under the auspices of the **ORGANIZATION for European Economics Co-operation** to study galvanizing techniques in the U.S.A.

★ ★ ★

The final report, comprising 138 pages of text matter, has been published by the O.E.E.C. and may be ordered from the O.E.E.S. Mission, Suite 61, 2002 P Street, N.W., Washington 6, D. C. at a cost of $2.00 per copy.

★ ★ ★

It is written by 29 of Europe's foremost practical galvanizing experts, is copiously illustrated, and treats of various practices in galvanizing sheet, strip, tubing and wire. The different processes are analyzed and described.

★ ★ ★

In the forepart of the book two pages are devoted to a general statement of wire galvanizing here, but later on an entire chapter No. 4, is set apart for a more detailed study of the practices in 10 of our leading mills on the galvanizing of wire and wire products. This chapter occupies 31 pages of the report. The products covered are nails, chain link fencing and wire netting. Various hot dip and electrolytic processes are covered.

Symposium on Non-Destructive Testing

This informative Symposium was sponsored by ASTM Committee E-7 on Non-Destructive Testing, under the co-chairmanship of J. Smack of Sperry Products, Inc. and D. T. O'Connor, U. S. Dept. of the Navy, and was presented at the Fiftieth Anniversary Meeting of the **American Society for Testing Materials** in New York, June, 1952.

★ ★ ★

It contains the most advanced non-destructive testing methods and techniques in use throughout the world giving a first-hand view of those used in solving specific

non-destructive testing problems in Canada, France, Germany, Holland, Italy, and Switzerland.

★ ★ ★

Although it discusses principally the testing of metal: sheets, rods, castings, forgings, machined assemblies, and the like (plastics, too, are mentioned), the Symposium provides excellent data and ideas for non-destructive testing of other materials.

★ ★ ★

The text is richly illustrated with photographs of equipment, manipulative techniques, and oscilloscope patterns when applicable, as well as diagrams and charts.

★ ★ ★

The book contains eight pages, is 6 x 9 in size with heavy paper covers, has 105 pages of texts and sells for $2.00. Send orders to the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Booklet on ACSR

Major milestones in the development of aluminum electrical conductors by **Aluminum Company of America** are described in "Alcoa Research and Progress In Electrical Conductors," a booklet just published by Alcoa.

★ ★ ★

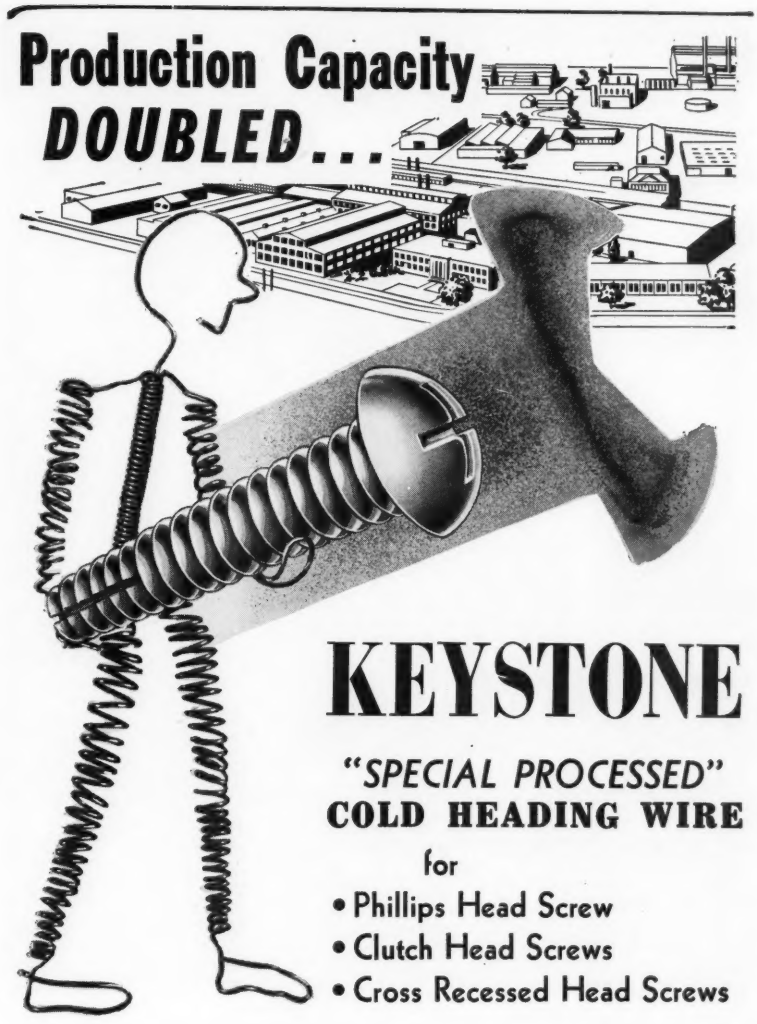
Alcoa's large concentration of electrical conductor research facilities and equipment at its Massena, New York, Electrical Conductor Laboratory is highlighted in pictures, with many outstanding examples, of aluminum conductor installations shown.

★ ★ ★

The text traces the history of Alcoa conductor research, covering both its pioneering development work and present projects. Among the developments described are all-aluminum cable, ACSR (Aluminum Cable, Steel Reinforced,) Expanded ACSR, bus conductor, and accessories. Alcoa's special engineering work on vibration and sag factors is also included.

★ ★ ★

The 20-page two-color booklet



The unique upsetting qualities of Special Processed wire are recognized by licensed recess head screw manufacturers across the nation. The excellent flow properties of this superior cold heading wire together with its structural soundness give this wire unsurpassed performance on difficult cold heading jobs.

To meet the ever-increasing demand of new customers while continuing to serve its present customers, Keystone is doubling its production capacity on Special Processed wire. We'll be glad to show you how Special Processed wire can improve the quality of your product and lower your production costs. Write us for additional information.

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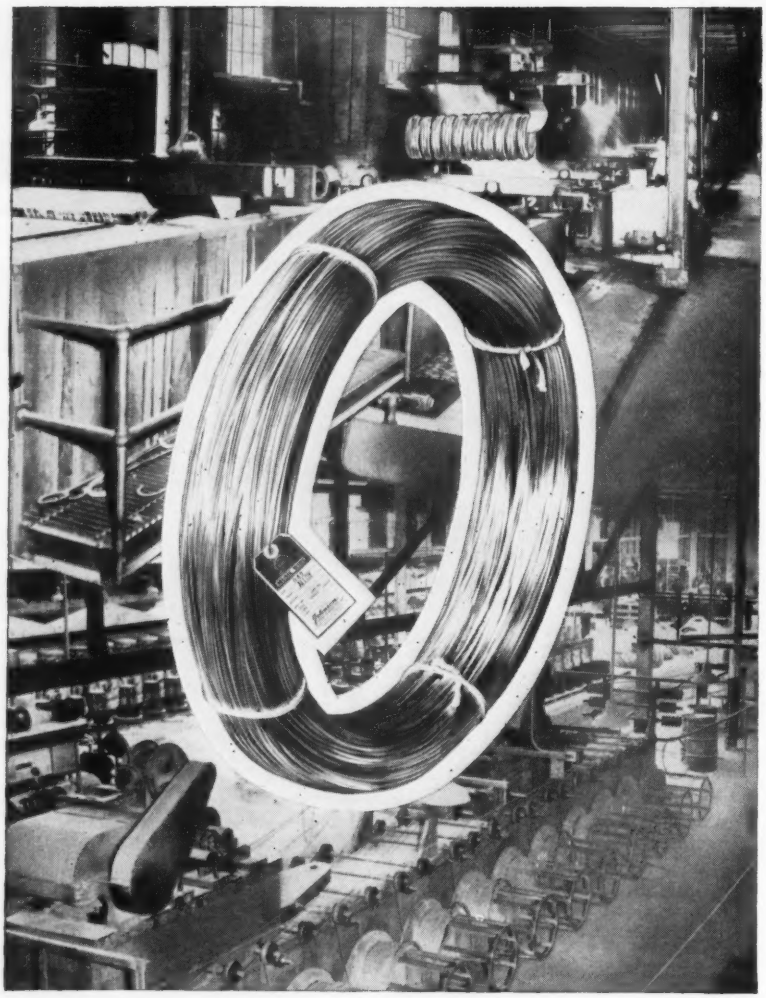

An educated man is one who has finally discovered that there are some questions to which nobody has the answers.

And this is true in the wire business. But through more than a quarter of a century of progress we here at Johnson have discovered many solutions to wire problems—and, as for those that nobody appears to have answers to, our experts are constantly on the research—confident that time and study will lead to advancement—and that the Johnson product—specialty wires—will find new uses and prove to be more useful in the broad field of American industry.

JOHNSON STEEL AND WIRE COMPANY, INC.

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A SUBSIDIARY OF PITTSBURGH STEEL COMPANY

also includes listings of Alcoa's basic technical reference material on aluminum conductors.

★ ★ ★

Engineers and executives in the electric power field will find "Alcoa Research and Progress In Electrical Conductors" of special interest. Copies may be procured through Alcoa Sales Offices or from Aluminum Company of America, 725 Alcoa Building, Pittsburgh 19, Pennsylvania.

Brochure Describes Facilities for Meeting the Increased Demand for Aluminum in the Electrical Industry

A new four-page brochure published recently by **Reynolds Metals Company** outlines its expanded facilities for producing wire, cable and bus conductor to meet the ever increasing demand for aluminum in the electrical industry.

★ ★ ★

Reynolds Listerhill, Alabama, plant is featured where over 200,000 square feet of floor space is devoted to wire and cable manufacture. This mill is well equipped with all the latest type wire and cable manufacturing facilities, including one machine that measures the strength of aluminum cable in regular production tests. It can exert a pull of 120,000 pounds, enough to lift forty automobiles at one time.

★ ★ ★

Reynolds Master Reel and Master Coil, which eliminate wood reels and lower reel costs, are shown in this publication, as well as typical installations of aluminum cable, steel reinforced and all-aluminum cable as well as Neoprene covered conductor. There are also illustrations of bus duct and bus bar which are now standard for many leading manufacturers of electrical control equipment; and the various types of aluminum bus conductor made by Reynolds.

★ ★ ★

Copies of this brochure may be obtained without cost by addressing your request to Reynolds Metals Company, 2500 South Third Street, Louisville 1, Kentucky.

Outstanding Personalities of the Wire Industry

Longwell Organizes Consulting and Sales Firm

James R. Longwell, who had been assistant to the general manager of Carboloy Department of General Electric Company has announced his retirement from the organization, effective April 30th.

★ ★ ★

He has formed **Longwell Engineering-Sales Company,** engineering and sales consultants, which will also be sales representatives for several manufacturers of industrial equipment. The latter includes the **P. L. Kuzmick Co.,** Verona, N. J., diamond grinding wheel manufacturers. The company opened its new offices in Birmingham, Mich., a Detroit suburb, on May 1st.

★ ★ ★

A leader in the development of the carbide industry in the United States since it was started on a production basis by General Electric Company, Mr. Longwell has been with Carboloy since the early days of the organization. He joined it as a die development engineer in 1929, handling engineering, design, application, pricing and sales development for wire, tubing, bar and sheet metal dies.

James R. Longwell

He was made chief engineer in 1935 and named factory manager in 1942. Mr. Longwell developed tool and blank production mechanization, reducing manufacturing costs. He became director of engineering and research in 1944.

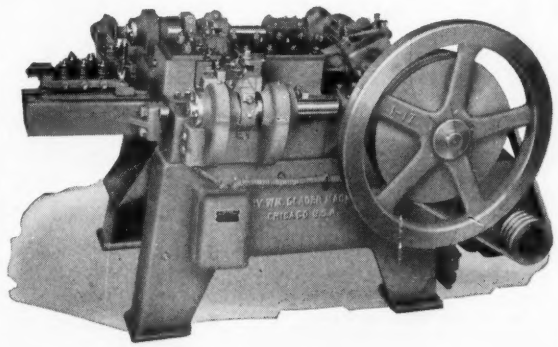
★ ★ ★

He became assistant to the general manager in 1948, and represented the Carboloy Department in Washington during the period of the establishment of material controls. During this period he made an industry-wide survey of tungsten requirements.

★ ★ ★

A mechanical engineering graduate of Cornell University, Ithaca, N. Y., Mr. Longwell also holds a master of arts degree from Highland Park College, Des Moines, Iowa.

GLADER HIGH SPEED WIRE NAIL MACHINE



MACHINE ARRANGED FOR INDIVIDUAL MOTOR DRIVE

High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

WM. GLADER MACHINE WORKS
210 No. Racine Ave.
Chicago 7, Illinois

Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

Appointments by Waterbury Farrel

The promotion of **Harry Lange** from Assistant Chief Engineer to Chief Engineer in charge of the Bolt, Nut, Screw & Rivet Machinery Division has been announced by the **Waterbury Farrel Foundry & Machine Co.**, Waterbury, Conn.

★ ★ ★

This position was formerly held by **Joseph M. Schaeffer** who was recently elected to the presidency of the company.

★ ★ ★

At the same time the company also announced the appointment of **George Backman** as manager and chief engineer of their Rolling Mill and Mill Machinery Division. Mr. Backman succeeds **Irving H. Tolles** who has retired from the position of manager of this division.

★ ★ ★

Mr. Backman first joined the company in 1930, as an engineer in the Press Department where he worked on the design and development of presses and cartridge machinery. In 1936 he was transferred to the Rolling Mill Machinery Division as an assistant to Mr. Tolles.

Organization Changes Announced by S.I.C.

Standard Industrial Compounds Co., Inc., 4600 W. Ferdinand St., Chicago 44, Ill., has announced that on April 1, 1954, a series of changes, planned for some years, had been effected: These are:

From President to Chairman of the Board, ***Floyd M. Hauger.***

From Chicago Area Sales and Service to President, ***John A. Moritz.***

Remaining as Vice President in charge of Sales, ***Earl A. Bowers, Jr.***

A new member as Secretary-Treasurer, ***George Sloan.***

A new member as Technical Director, ***Dr. Grey Verner.***

Remaining as Plant Superintendent, ***Joseph Beegle.***

★ ★ ★

Rounding out the organization in the capacity of Sales-Service Representatives are: **Bruce Sieman, Robert L. Barton** and **Arthur J. O'Mara.** John Moritz and Earl Bowers, Jr., will also be active in Sales-Service work.

★ ★ ★

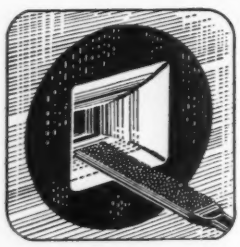
As in the past, great emphasis will be placed on service for which S.I.C. has been noted, along with the development of new and better products for drawing and protecting ferrous and non-ferrous metals.

★ ★ ★

The presence of Floyd Hauger and "Doc" Verner gives Standard two men of outstanding reputation in technical and research work in the field of wire drawing lubricant development.

★ ★ ★

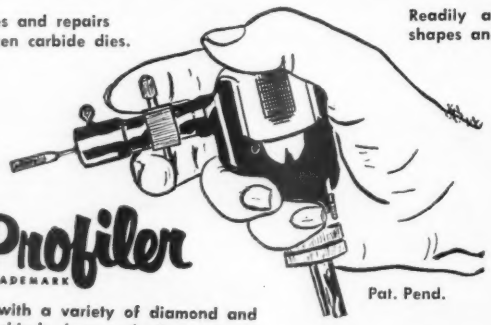
The company takes this opportunity of thanking its many friends and customers for their splendid cooperation and support over the years and of assuring them of its intention to maintain its high quality of service through



REDUCE DIE REPAIR COSTS WITH THIS NEW TOOL

Makes and repairs tungsten carbide dies.

Readily adapts to special shapes and contours.



Pat. Pend.

SHARPENS
GRINDS
FILES
SCRAPES
HONES
LAPS
SAWS
STONES
CUTS
FINISHES
POLISHES

the * **Di-Profiler** TRADEMARK

SAVE YOUR TOOL MAKERS AND MAINTENANCE MEN BY PROVIDING TOOLS TO DO THE HARD, TIRING PART OF THEIR WORK.

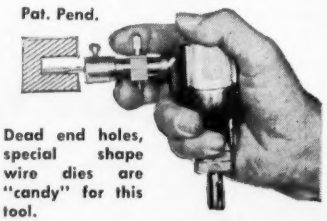
*DI-PROFILER ELIMINATES THE HARD "ELBOW GREASE" WORK.

is furnished with a variety of diamond and needle files, chisels, burs and other units of many intricate shapes, thereby reducing the tool and die maker's problem of special tools (made on your time) by 90%.

The *Di-Profiler can be used for repairing dies, even without removing from machine. You can hold your files absolutely level for straight holes and provide an oscillating motion for contour. The reciprocating action does the work at a stroke ranging from 0" to ¼", without vibration because of the high precision of the tool. Once you see it—you'll never be without the *Di-Profiler. Write for full details and ask for a demonstration.

Everything comes in an attractive mahogany finished box — except the flexible shaft, rotary attachment and motor.

Pat. Pend.



Dead end holes, special shape wire dies are "candy" for this tool.

Nord International Corp.

449-W CENTRAL AVENUE, ORANGE, NEW JERSEY

*An exclusive Nord Trade Mark

personal consultations on wire drawing problems and with fine products.

New Company Organized to Manufacture Carbides

Firth-Loach Metals, Inc. has been incorporated and launched under the guiding hands of long-experienced **L. Gerald Firth** and **William J. Loach.** The company will confine its activities principally to the manufacture of cemented carbides for tool tips, dies, wear parts, etc. It will not make finished products, but will combine tungsten powder, titanium oxide, tantalum oxide, carbon black and cobalt or other binder metal to form by suitering the blanks or nibs that others may finish.

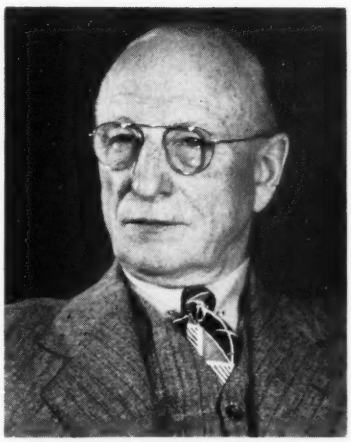
★ ★ ★

The company has its office presently in the Union Trust Building, Pittsburgh, with the plant located on Butternut Hollow Road in West Miflin, Pa., but expects to move it to the plant at a later date.

★ ★ ★

Mr. Firth was formerly associated with Firth Sterling, Inc. and its predecessors. He was Works Manager from 1918 to 1926, General Manager from 1926 to 1933, President from 1933 to 1947 and Vice President in charge of Research from 1949 to October 1, 1953. He was also a director during all this time. He is President and Director of the new concern.

★ ★ ★



L. Gerald Firth

Mr. Loach was associated with Firth Sterling, Inc. as a Research Engineer from 1927 to 1929, as Superintendent of the Carbide Metal Department from 1929 to 1948, as Manager of the Quality Control Department of the Powdered Metals Division from 1949 to October 26, 1953. He is Vice President, General Manager and Director of Firth-Loach Metals, Inc.

★ ★ ★

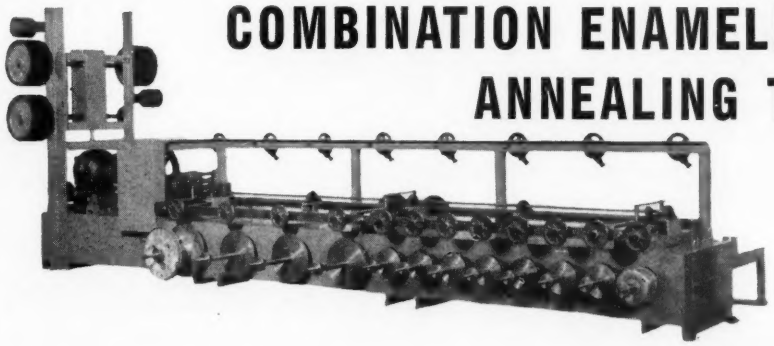
The corporation is authorized to issue 50,000 shares of stock with a par value of $25.00 per share, 34,000 shares of which will be outstanding when subscriptions are closed. Some shares are still available to those who may be interested in becoming part owners of the enterprise.

★ ★ ★

Arrangements have been concluded for adequate supplies of all the new materials required for the production of cemented carbides and the company has arranged for the installation of the most modern

A New and Efficient • • •

COMBINATION ENAMELING AND ANNEALING TAKE-UP



FEATURES

- Built specifically for Teflon and Kel-F coating and dipping processes.
- Has variable speed range ratio of 3 to 1, or speeds of from 3 to 300 ft. per minute.

Versatile—can also be used as annealing furnace take-up.

Reel sizes: 4 heads 6″ x 12″ with 1¼″ arbor bore and 8 heads with 3″ x 6″ reels with ⅝″ arbor bore. Size of reel arbor bores optional. Handles wire in gauges ranging from #8 down to #36, B&S.

Built-in let-off for heavy gauges with ball-bearing shafts for 8″ x 12″ or 12″ x 18″ reels. Equipped with single power take-off capstan and double capstan power take-up.

ALSO: Special machinery for strand annealing, tinning units, gang winders, wire drawing machines, re-spoolers, die making machinery for polishing and lapping, wire strand retipping machine, and enameling equipment.

WOODSIDE WIRE CORPORATION • GREENWOOD AVENUE WORTENDYKE, NEW JERSEY

and economical equipment for an initial production of 500 pounds per month of hot pressed carbide metals and 3,000 pounds per month of cold pressed carbide metals.

★ ★ ★

Carbides, introduced to this country from Germany in 1928, have gone a long way since that time, both in manufacturing techniques and in applications. The new company brings to industry the finest calibre of experience and knowledge of cemented carbides.

Elected Vice Presidents of Pennsalt

The Board of Directors of the **Pennsylvania Salt Manufacturing Company** has established and filled two new offices.

★ ★ ★

Dr. William Alfred LaLande, Jr. was elected vice president and will continue as Manager of Research & Development and **Edward F. Beale,** also named vice president, was re-appointed Treasurer of the Company.

★ ★ ★

These appointments, according to President **George B. Beitzel,** represent another phase in the implementation of Pennsalt's recently announced organizational expansion.

★ ★ ★

Dr. LaLande, a graduate of the University of Pennsylvania, joined Pennsalt in 1944, and has been directing Pennsalt's research and development program at Wyndmoor (Pa.) since 1948.

★ ★ ★

Mr. Beale attended the William Penn Charter School and is an alumnus of Princeton University. In 1946 he joined Pennsalt as Assistant-to-the-Treasurer and was named Controller in 1948 and Secretary and Treasurer in 1951.

Cook and Clarke Become Top Hunter Spring Officers

Shareholders of the capital stock of **Hunter Spring Company,** Lansdale, Pa., recently met to elect a new directorate and slate of officers, and insure the continued aggressive management of this leader among precision spring producers, following the untimely recent death of **Knowlton D. Montgomery,** who served as president and chairman of the board until last month.

★ ★ ★

The new directors are: W. J. **Cook, P. C. Clarke, C. Randle Grimes, W. R. Spofford,** and **H. O. Hess.** Immediately following the meeting of shareholders the new board met to elect **W. J. Cook** as president, **P. C. Clarke** as executive vice-president, **S. K. Freed** as treasurer, **H. O. Hess,** as secretary, and **F. E. Cassel** as assistant secretary.

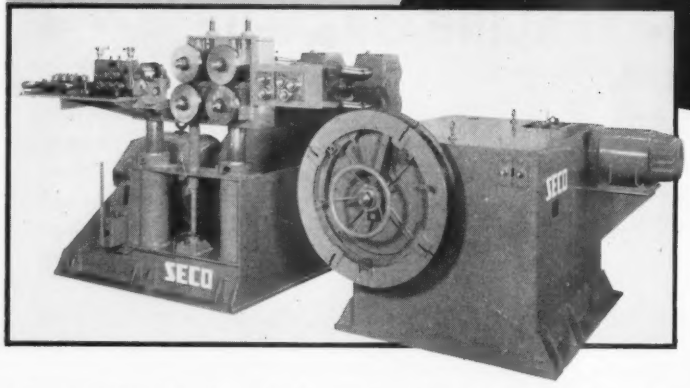
★ ★ ★

Mr. Cook, the former vice-president and general manager, has long led the producing operations at Hunter, and P. C. Clarke, formerly secretary and assistant general manager, is noted for his contributions since 1932 to the engineering and sales development of the firm. Both were key figures in the introduction of the neg'ator, the new reverse-acting elastic

Outstanding Features Superior Performance

NEW Heavy Duty COILER for Electrode Wire

DOES ALL THESE OPERATIONS



1 - STRAIGHTENS 2 - MEASURES
3 - FEEDS 4 - PRECASTS 5 - COILS

This Coiler handles welding wire of 3/32" to 3/8" diameter at 200 to 800 F.P.M. on blocks of 12" to 25" diameter.

Mechanically it consists of two separate units: the first doing the straightening, measuring, feeding and pre-casting of the wire, the second doing the coiling only.

Electrically both units are tied together in as much as all motors are controlled from one VS drive and control unit.

Write for full information and data—or consult our engineers on your coiling problems—no obligation.

- Puts a predetermined cast in the wire prior to its coiling on the block.
- Makes a traverse wound coil which will easily uncoil although being close and tightly wound with no danger of springing open.
- First unit equipped for hydraulically raising or lowering the entire roll assembly for proper lineup with the block diameter.
- Complete control over traverse mechanism for delaying reversal at stroke ends.
- Compact construction with easy accessibility to all moving parts.

STEEL EQUIPMENT CO. 20805 AURORA ROAD CLEVELAND 22, OHIO

SECO

member which has created so much engineering news and found such wide application throughout the technical world since 1949. Mr. Clarke has also been one of the nation's leaders in the development and application of statistical quality control techniques to components manufacture.

Named Vice President and General Manager of Continental Steel

Continental Steel Corporation, Kokomo, Indiana today named **Edmond P. Severns** as Vice President and General Manager of the corporation. Mr. Severns, who has been Vice President in Charge of Sales for the company, has been with Continental for the past twenty-seven years. Prior to that he was sales manager of the Chapman Price Steel Company until 1927, at which time it became a part of the Continental Steel Corporation. In 1938 he was named Sheet Sales Manager for all Continental plants and he was made Vice President in Charge of Sales in 1939.

Made Engineering Consultant by Stanat

A. I. Nussbaum has been appointed engineering consultant by the Rolling Mill Division of **Stanat Manufacturing Co.,** Long Island City, N. Y., designers and builders of metal processing machinery. A graduate of the University of London, Mr. Nussbaum has been active in the field of rolling mill research, development and practice both in England and in the United States for the last ten years.

To Manage Cleveland Office for Townsend

Townsend Company has named **Alfred H. Moore** Assistant Division Manager of the North Central Division Sales Office in Cleveland.

★ ★ ★

Mr. Moore formerly was a sales representative in the Rochester, N. Y., territory of Townsend Company, the nation's oldest manufacturer of fasteners and largest producer of rivets and cold headed parts. He joined the Sales Department of Townsend in 1948 and in 1950 was promoted to Manager of the General Sales Office.

★ ★ ★

A native of New Brighton, he attended Geneva College in nearby Beaver Falls, Pa., and worked in the Sales Department of the Pressed Steel Car Company in Pittsburgh before joining Townsend.

★ ★ ★

The Townsend Company also announced the transfer of Sales Representative **R. H. Willoughby** from Chicago to Rochester, N. Y.

Officers Elected by Loewy-Hydropress

Hugo Lorant, Vice-President and Member of the Bord of **Hydropress, Inc.,** New York, has been elected Senior Vice-President and **Paul Mayer** appointed Assistant Vice-President of the Company.

SEE THE DIFFERENCE YOURSELF...
BETWEEN JUST ANY SPOOL AND
Superior MPS
NO-CREV SPOOLS
No-Crev Spools eliminate the conventional crevice at the inner junction of spool head and barrel. No more production slow-ups due to fine wires getting caught in such a crevice. You can now have continuous trouble-free high speed winding.
We invite your inquiries — let us tell you more about No-Crev Spools. Write us today.
MPS
NO-CREV SPOOLS
give you brute strength with dimensional precision, concentricity, and balance. Another patented MPS development engineered to help you!
Mossberg PRESSED STEEL Corporation
18 WEST ST., ATTLEBORO MASSACHUSETTS, U. S. A.
Telephone Attleboro 1-0848
#108

Beryllium Corporation Appoints Pittsburgh Firm as Distributor

The Beryllium Corporation, Reading, Pennsylvania, announces the appointment of **Williams and Company, Inc.,** 901 Pennsylvania Ave., Pittsburgh 33, Pennsylvania, as distributor of BERYLCO beryllium copper strip, rod and wire.

★ ★ ★

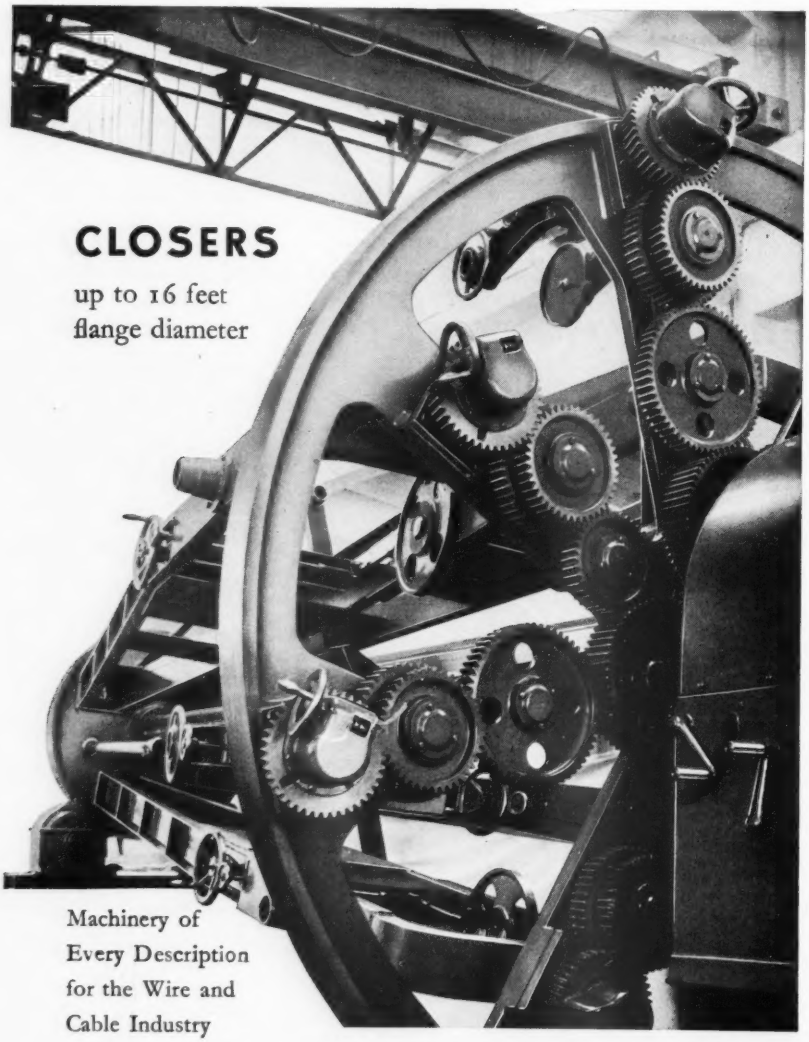
This company maintains warehouse facilities and sales offices in Cincinnati, Toledo, Cleveland, Columbus and Louisville, as well as in Pittsburgh. They will supply beryllium copper in the states of Ohio, Western Pennsylvania, Northern Kentucky and West Virginia.

★ ★ ★

Warehouse stocks of BERYLCO beryllium copper strip and rod have already been established at the Williams warehouse in Cleveland.

★ ★ ★

The growing acceptance of beryllium copper for electrical, electronic and mechanical applications has created a need for local warehouse stocks which this new distributor will supply to the trade in the important industrial states which it serves.



Machinery of
Every Description
for the Wire and
Cable Industry

MAILLEFER S.A.

RENENS - LAUSANNE (SWITZERLAND)

MACHINERY FOR THE WIRE INDUSTRY

A S & W Appoints Assistant General Traffic Manager

Appointment of **Leo Gallagher** as assistant general traffic manager in charge of rates for **American Steel & Wire Division** has been announced by **James Ramsey, Jr.,** general traffic manager for this Division of **United States Steel Corporation.**

★ ★ ★

Born in Indianapolis, Indiana, in 1895, where he completed his primary and high school education before attending Lains Business College, Mr. Gallagher joined American Steel & Wire as assistant to general traffic manager in 1945.

★ ★ ★

He held a number of positions in the American Steel & Wire traffic department until November, 1948, when he was named traffic manager of the freight rate bureau —a post he has held until his present promotion.

Worcester Man Elected to Controllers Institute

James S. Howard treasurer and clerk, **Johnson Steel & Wire Company, Inc.,** Worcester Massachusetts, has been elected to membership in the Controllers Institute of America.

★ ★ ★

Established in 1931, the Institute is a non-profit organization of controllers and finance officers from all lines of business—banking, manufacturing, utilities, distribution, transportation, etc. The total membership exceeds 4,300.

Keystone Promotes D. A. Sommer

The promotion of **Donald A. Sommer** to Assistant Sales Manager, Industrial Division of the **Keystone Steel & Wire Company** has been announced by **Ford P. Schusler,** Sales Manager, Industrial Division.

★ ★ ★

Mr. Sommer joined Keystone in October 1950. Following a year's training in various plant depart-

ments, he was assigned to the Industrial Sales Division in September 1951. Previously he had attended the University of Illinois and graduated from Bradley University in 1950.

General Cable Elects Bennett Chairman

Election of **Irving T. Bennett** as chairman of the board of **General Cable Corporation** has been announced by the company. He will continue also as the company's chief executive officer, a position he has held since August, 1953. As chairman, he succeeds **Dwight R. G. Palmer,** who is retiring after 35 years with General Cable Corporation and its predecessor companies.

★ ★ ★

Mr. Bennett came to General Cable in April, 1953 as a director and chairman of the executive committee. Previously, he had been vice president and general manufacturing manager as well as a director of **Revere Copper and Brass Inc.,** which he joined as sales promotion manager in 1929. From 1944 to December, 1952, he had been vice president in charge of the Baltimore and Aluminum divisions of Revere.

★ ★ ★

Although Mr. Bennett holds a bachelor degree in metallurgy and a master of science degree in metallography from Yale University's Sheffield Scientific School, he has devoted much of his business career to sales work. After three years as Revere's sales promotion manager, he was transferred to Revere's Rome, N. Y., division where he founded the company's technical advisory service to customers, which has become a major sales adjunct. Later he was named assistant sales manager in charge of industrial sales.

★ ★ ★

Because of his sales, technical and manufacturing experience, Mr. Bennett was chosen in 1943 to become general manager of Revere's expanded light metals development in Baltimore and was elected vice president in charge the following year.

★ ★ ★

During his eight years as head of Revere's Baltimore operations, Mr. Bennett not only built up aluminum production and sales facilities but also greatly expanded the output of the many copper and brass products made in Revere's Baltimore division. Especially notable was the production record during World War II when there were more Government Plancor operations in Baltimore than were conducted by any others in the non-ferrous metals industries at any one site.

★ ★ ★

Mr. Bennett was born in Stratford, Conn. in 1900 and first entered the copper industry in 1918 in Bridgeport. Following his graduation from Yale, he went to work for the Metropolitan Engineering Company of Brooklyn and, while holding this position, worked toward his master of science degree which he received in 1923.

Hooker Adds to Research Staff

Newly assigned to **Hooker Electrochemical Company's** Research and Development Department are **Dr. Joseph J. Wylegala, Dr. Emil J. Geering,** and **Dr. Paul E. Hoch.**

A WET-DRAWING PROBLEM THAT'S SIMPLER THAN A-B-C!

If you are wet-drawing non-ferrous metals, you'll find that Nopco DURPONS provide optimum performance for *twice as long* as conventional wire-drawing compounds. Yet they cost you no more.

There are two sound reasons for this profitable performance: All Durpon compounds contain (1) a buffer, to maintain the pH level, keep the emulsion from breaking; (2) a special sequestering agent, which holds the metal particles away from the effective drawing ingredients, *keeps the bath clean.*

Try some of these high-performance wire-drawing compounds today. You won't need anything more complicated than a slate to keep your comparative records. And you'll come out way ahead!

"Stay Stable Longer"

DURPON—for intermediate gauge wire

DURPON L—for heavy wire, rods, and tubes

DURPON FW—for fine wire

Mail coupon for technical bulletin and free trial sample.

*Reg. U. S. Pat. Off.

NOPCO
CHEMICAL COMPANY
Harrison, New Jersey
Cedartown, Ga. • Richmond, Calif.

NOPCO CHEMICAL COMPANY, Harrison, N. J.
Gentlemen: Please send me a copy of your technical bulletin and a free trial sample of: DURPON ___
DURPON L ___ DURPON FW ___
NAME_____TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ZONE___STATE_____

Dr J. H. Bruun, the director of the department, made the announcement of the three new appointments.

★ ★ ★

Drs. Wylegala and Geering have been assigned to the Chlorination Research Group under the supervision of **Aylmer H. Maude.** Dr. Hoch has been assigned to the Plastics and Resins Group, under the supervision of **Paul Robitschek.**

In Executive Post With H. K. Porter Company

W. Harvey Thompson has been named Assistant to the Executive Vice President of **H. K. Porter Company, Inc.** according to an announcement by **T. M. Evans,** the concern's President.

★ ★ ★

Before joining Porter, Mr. Thompson was Vice President of Standard Instrument Corp. of New York and previously had been Sales Manager of the New York District for Diebold, Inc. He succeeds **R. F. Allen** who has been elected a Vice President in charge of Porter's Buffalo Steel Division.

★ ★ ★

The Porter manufacturing units include Alloy Metal Wire Company, Buffalo Steel Division, Connors Steel Division, Delta-Star Electric Division, Leschen Wire Rope Division, Quaker Rubber Corporation, The McLain Fire Brick Co. and The Watson-Stillman Company.

Refinishing Wire Drawing Dies?

Save Money with NORBIDE® Abrasive . . .

Second in hardness only to diamond which costs a hundred times more

Johnson Steel & Wire Co., Inc. has substantially reduced the cost of refinishing their wire drawing dies by substituting NORBIDE Abrasive for costly diamond dust. Excellent for ripping or for fast stock removal as well as for accurate semi-finishing operations.

High accuracy is important to Johnson for Johnson "music" spring wire is drawn in 200 different sizes, all the way from .003″ to .200″.

If you are still using diamond dust for your ripping and semi-finishing operations, you'll be amazed at the savings you can obtain by switching to NORBIDE Abrasive.

For cost-cutting abrasive details, write for Form 559.

NORTON COMPANY

45 New Bond Street • Worcester 6, Massachusetts

NORTON

BORON CARBIDE

NORBIDE® . . . the hardest man-made abrasive

Sheet & Tube Appoints Chicago District Manager

Arch J. Cochrane of Hammond, Ind. has been appointed manager of Chicago district operations for **The Youngstown Sheet and Tube Company,** succeeding **B. M. Stubblefield** who retired on April 30th.

★ ★ ★

Mr. Cochrane has been assistant manager for three years. His new appointment was announced at Youngstown, O., by **W. H. Yeckley,** general manager of the company's steel operations.

★ ★ ★

A native of Cleveland, Cochrane attended Western Reserve University in Cleveland and studied metallurgy at Purdue University.

★ ★ ★

He began his steel career at the age of 18 as a machinist helper with the American Steel and Wire Company during summer vacations. He served a machinist apprenticeship and advanced to assistant to the general master mechanic of American Steel and Wire. He joined Youngstown on May 1, 1951.

Metal and Thermit Sales Executive Changes

Metal & Thermit Corp., New York, N. Y., has appointed **Frank J. O'Brien, Jr.** general sales manager. He joined the firm in 1951 as manager of its scrap division and has been a vice president since 1952. **John B. Tinnen,** formerly

vice president-general sales manager, continues as chief executive sales officer of the company with extended activities including general administration and planning for company expansion. **H. W. Buchanan Jr.** was appointed sales manager, chemical division.

Steel Company Changes Name

Friedman Bros. Steel Co., (2600 So. Sacramento Ave., Chicago,) has changed its name to **Darco Steel & Wire Co.** The firm will continue to operate Darco Metal Litho Co. as a division.

Royce G. Martin

Royce G. Martin, president and chairman of the board of **The Electric Auto-Lite Company,** Toledo, Ohio, died of a heart attack on May 1st in Lexington, Ky.

★ ★ ★

One of the most colorful and individualistic figures in the automotive industry, Mr. Martin's rise to prominence was a fabled American success story. He was born in Clint, Texas, on June 7, 1884. After finishing his schooling, he became an apprentice for the Western Electric Company in Chicago. Later he worked in the tool shop of Felt & Tarrant Company, makers of marine motors.

★ ★ ★

In 1909 Mr. Martin returned to his native Texas to work for the Mexican National Railroad in El Paso. He became president and general manager of the Automobile Mortgage Corporation of Texas after World War I. In 1921 he assumed control of the Safe-T-Stat Corporation in Brooklyn, a manufacturer of visual thermometers for automobile radiator caps.

★ ★ ★

In subsequent transactions, Safe-T-Stat acquired the entire capital stock of the Nagel Electric Company of Toledo and absorbed the Moto-Meter Company of Long Island City, N. Y., and the National Gauge and Equipment Corporation of LaCrosse, Wisconsin. The corporation was named the Moto-Meter Gauge and Equipment Corporation, and Mr. Martin served as president and director.

★ ★ ★

Mr. Martin became president of The Electric Auto-Lite Company in 1934 when Moto-Meter and Auto-Lite merged. He succeeded to chairman of the board in 1944 after the death of **C. O. Miniger,** founder of the firm.

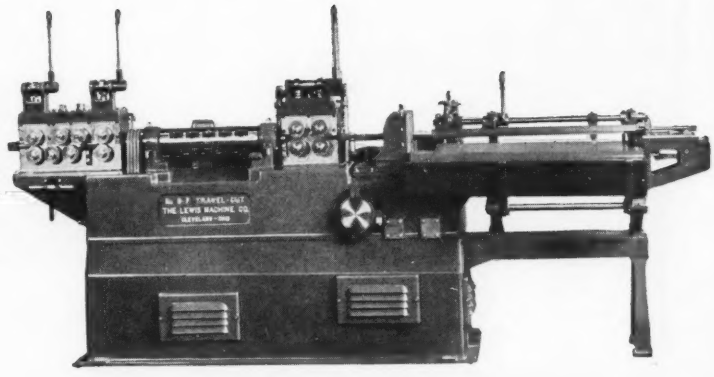
★ ★ ★

Under his leadership, Auto-Lite's annual sales grew from about $34 million in 1934 to nearly $300 million in 1953. He not only strengthened the firm's position in the original equipment field to include almost every automobile manufacturer, but also expanded Auto-Lite's position in replacement sales until Auto-Lite became the world's largest independent manufacturer of automotive electrical parts. Today Auto-Lite operates 30 plants in the U. S. and Canada, including two large wire and cable plants at Port Huron, Mich., and Hazleton, Pa.

Fast, Accurate, Economical

STRAIGHTENING and CUTTING

with LEWIS **TRAVEL-CUT**



22 Models to handle from .012" to ¾" Round, Hex, Flat, Shapes.

Simple in design, rigid in construction, Lewis TRAVEL-CUT will delive. continuous dependable service under the most severe, high production conditions—day in, day out. Feeds wire from the coil, straightens accurately, gauges to uniform length, and cuts clean without stopping the wire. For steel, brass, aluminum and alloy wire. Cut your cutting costs with the Lewis TRAVEL CUT. Full details on request.

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WEST COAST: Hoffman & Heartt, 3005 So. Grand Ave., Los Angeles 7, California.

CANADIAN: Empire Engineering Co., 738 Dundas St., East, Toronto, Ont., Canada

CONTINENTAL EUROPE: Gaston E. Marbaix Ltd., Devonshire House Vicarage Crescent, London S. W. 11, England.

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3441 E. 76th Street, Cleveland 27, Ohio

Also agents in Paris, Stockholm, Rotterdam, Brussels, Zurich, Milan, Bombay and Melbourne

A Review of Recent Wire Patents

No. 2,673,979, NAILMAKING MACHINE, patented April 6, 1954, by Jose M. Bolano, Buenos Aires, Argentina.

A nailmaking and nailing machine is provided adapted to form nails from sheet-metal blanks and to drive the formed nails out under hammer action.

★ ★ ★

No. 2,674,007, EXTRUSION MACHINE FOR THE PRODUCTION OF AN INSULATING COVERING OF AN ELECTRICAL CONDUCTOR, patented April 6, 1954, by Ernst Allemann, Breitenbach, and Ernst Fritschi and Herbert Leu, Busserach, Switzerland, assignors to Schweizerische Isola-Werke, Breitenbach, Switzerland.

An extrusion machine for the production of an insulating covering consisting of helically wound threads of thermoplastic material on an electrical conductor is disclosed. There are 18 claims.

★ ★ ★

No. 2,674,022, CLOTHESPIN, patented April 6, 1954, by Howard E. Ott, Glendale, Calif.

This clothespin is formed of a single length of looped and twisted wire.

★ ★ ★

No. 2,674,181, COIL BUNDLING APPARATUS, patented April 6, 1954, by Melvin P. Jones, Bartonville, Ill.

The apparatus includes a device to loop a length of wire around a coil, cut-off means to cut the wire adjacent the loop, a rotatable head having axially extending parts thereon engageable with the ends of the loop to twist them together, parts in the head shiftable axially thereof to engage the twisted ends of the loop and bend them inward, and a device periodically to move the last named parts axially and beyond the wire engaging parts to disengage the wire from the engaging parts.

★ ★ ★

No. 2,674,250, APPARATUS FOR PROCESSING OF STEEL STRIP CONTINUOUSLY, patented April 6, 1954, by Ralph Dunlevy, Harold Frick, and John H. Shoemaker, Detroit, Mich., assignors to Kolene Corporation, Detroit, Mich.

More specifically, this is an apparatus to clean the surface of metal strip by passing the same through a liquid bath comprising a molten alkali metal salt.

★ ★ ★

No. 2,674,251, APPARATUS FOR CLEANING METAL STRIP CONTINUOUSLY, patented April 6, 1954, by Ralph Dunlevy, Harold Frick, and John H. Shoemaker, Detroit, Mich., assignors to Kolene Corporation, Detroit, Mich.

This is a divisional application identified with that of patent 2,674,250.

★ ★ ★

No. 2,674,298, METHOD OF CONTINUOUSLY FORMING A WIRE REINFORCED HOSE, patented April 6, 1954, by Richard G. Bringolf, Seattle, Wash., assignor, by mesne assignments, to Callahan Zinc-Lead Company, New York, N. Y., a corporation of Arizona.

The method is for continuously forming a hose from a flexible strip having one reinforced edge and an adhesive surface.

★ ★ ★

No. 2,674,414, TRANSFERRING AND CUTTING APPARATUS, patented April 6, 1954, by William T. Hicks, Glen Rock, and Daniel V. Waters, Lebanon, N. J., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

In this patent a continuous take-up apparatus is provided for distributing a strand over a given area to successive driven reels moved empty intermittently in a given path into a filling position and, when substantially filled, out of the filling position.

★ ★ ★

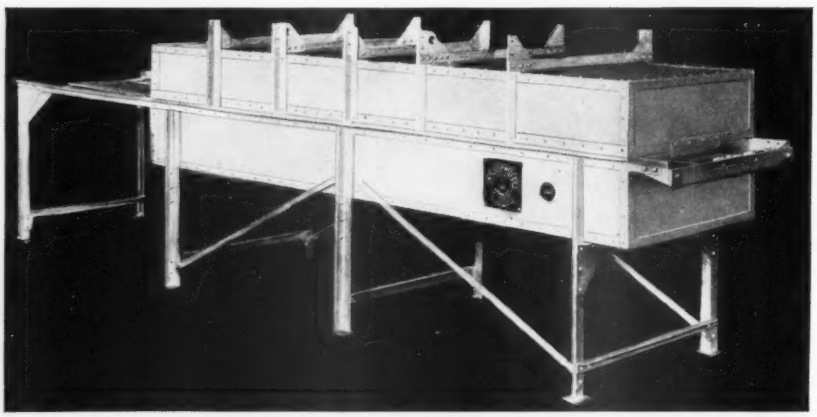
No. 2,674,424, FURNACE CONVEYER BELT, patented April 6, 1954, by John R. Gier, Jr., Hudson, Ohio.

A belt is disclosed comprising heavy wire truss members and connectors arranged alternately relative to each other in a row extending edgewise of the truss members for connection together in a series.

★ ★ ★

No. 2,674,551, METHOD OF PROCESSING OF STEEL STRIP CONTINUOUSLY, patented April 6, 1954, by Ralph Dunlevy, Harold Frick, and John H. Shoemaker, Detroit, Mich., assignors to Kolene Corporation, Detroit, Mich.

ROCKWELL FURNACES for Strand Bright Annealing...

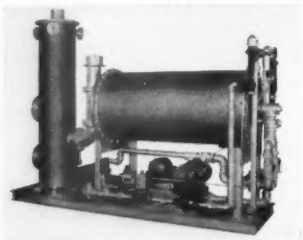


Rockwell electrically heated furnace for continuous strand bright annealing of fine steel, stainless steel or non-ferrous metal wire. Top of furnace is removable for easy servicing of elements and muffle tubes. This is but one of many Rockwell electric or fuel-fired, batch and continuous furnaces, direct heated, muffle or radiant tube type, for annealing, bright or clean annealing, hardening and drawing wire.

ROCKWELL ALSO BUILDS

- Batch and conveyor type ovens for aging, annealing or drying insulated magnet wire.
- Complete processing equipment for enameling, tinning, glass coating or synthetic coating magnet wire.
- Gas generators to provide protective atmospheres for bright annealing.

We invite your inquiries.



Rockwell 6000 C.F.H. gas atmosphere generator.

ROCKWELL SINCE 1888 BUILT

W. S. ROCKWELL COMPANY

FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY

2424 ELIOT STREET • FAIRFIELD, CONN.

Sales Representatives in Principal Cities

More specifically, the method is for cleaning metal strips by running continuous lengths thereof through a hot molten alkali metal salt in an atmospherically open bath.

★ ★ ★

No. 2,674,552, METHOD OF AND MATERIAL FOR COATING IRON AND STEEL SURFACES, patented April 6, 1954, by William A. Callahan, Detroit, and Frank L. Gendernalik, Royal Oak, Mich., assignors to Detrex Corporation, Detroit, Mich., a corporation of Michigan.

A metal coating composition is provided consisting essentially by weight of about 85—97.5% dihydrogen phosphate coating chemicals, about .5—5% licorice extract, and about 2—10% boric acid.

★ ★ ★

No. 2,674,553, RUSTPROOFING, patented April 6, 1954, by Meyer J. Shnitzler, Brookline, Mass., assignor to The Gillette Company, Boston, Mass., a corporation of Delaware.

This method of rust-proofing ferrous objects comprises contacting the same with an acid from the group consisting of benzoic, salicylic and phthalic acids, the acid being brought into contact with the object as a vapor in company with water vapor.

★ ★ ★

No. 2,675,420, INSULATED ELECTRICAL CONDUCTOR, patented April 13, 1954, by Leo R. Yeager, Upper Arlington, Ohio, assignor to Owens-Corning Fiberglas Corporation, a corporation of Delaware.

About the wire conductor is a covering composed of a continuous body of polyethylene completely surrounding the conductor, and fibrous reinforcement for the body of polyethylene composed of short strands of glass fibers distributed through the body and each composed of a multiplicity of glass fibers in compact side by side relation in textile strand form, the strands being haphazardly related to each other.

★ ★ ★

No. 2,675,566, BEDSPRING CONSTRUCTION, patented April 20, 1954, by Harry L. Lieberman, Chicago, Ill., assignor to Leonard-Chicago Corp., Chicago, Ill., a corporation of Illinois.

Wire coil springs are compressed by means of a cam arrangement between an adjusting frame and a support frame.

★ ★ ★

No. 2,676,452, WIRE TWINING MACHINE, patented April 27, 1954, by Edward Cook, New Haven, Conn., assignor to Edward Cook Machine Company, Wallingford, Conn., a partnership.

There are 11 claims to this wire twister.

★ ★ ★

No. 2,676,621, WIRE FORMING MACHINE, patented April 27, 1954, by Albert M. Bank, Jersey City and Alex J. Katz, Belleville, N. J.

The machine is adapted to form zigzag shaped wire. There are 6 claims.

★ ★ ★

No. 2,676,622, HOOK FORMING MECHANISM, patented April 27, 1954, by Paul Vargo, Lyndhurst, and Thomas A. Foster, Jr., Cleveland, Ohio, assignors to General Electric Company, a corporation of New York.

This mechanism includes a device for holding a stem having a pair of parallel leading wires projecting therefrom and of a hook bending mechanism arranged to be located adjacent the holding device.

★ ★ ★

No. 2,676,623, WIRE TYING MECHANISM, patented April 27, 1954, by Harold W. Bloss, Ottumwa, Iowa, assignor to Deere Manufacturing Co., a corporation of Iowa.

There are provided a rotatable twisting member for receiving strands of wire, and a kinking member to bend the twisted wire at two points, whereupon the strands are severed.

The information in this section is furnished by the patent law offices of LANCASTER, ALLWINE & ROMMEL, 438 Bowen Bldg., Washington 5, D. C. Data listed is only a brief review of recently issued patents obtained by various U. S. Pat. Off. registered attorney for manufacturers and/or inventors. Complete copies may be obtained direct from Lancaster, Allwine & Rommel by sending 50¢ for each patent desired. Outside of the U. S. and Canada the cost is $1.00 for each copy.

"You cannot bring about prosperity by discouraging thrift."—Abraham Lincoln

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(Cartridge Brass, 70%)

The availability of two closely controlled tempers makes possible more nearly perfect fabrication of cold-headed brass parts from wire of requisite "flow" characteristics (for heading and extruding), or of essential rigidity (for secondary machining). These two tempers are suitable for 99% of your cold-heading operations.

Scovill Extruded Cold-Heading Wire virtually eliminates—by reason of its higher copper content, production by the Hot Extrusion process, and closely controlled tempers—such defects (attributed to wire) as:

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2. "Out-of-round" heads.
3. Inadequate filling out of heads and shoulders.
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Let us help you select the proper applicable temper for A) HEADING and EXTRUDING, or B) HEADING and DRILLING. A trial run will convince you that there is an important difference in your products made from Scovill Extruded Cold-Heading Wire (Cartridge Brass, 70%).

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10SC548

Practice and Control for the Manufacture of High Carbon Commodity Wire

(*Continued from page* 627)

were conducted on .135″ Special Zig Zag Spring Wire and the wire was drawn from a lead patented .225″ rod in four drafts on 4-5 HR machines.

★ ★ ★

From these results, it is apparent that proper cooling should be exercised during all stages of high carbon wire drafting practice. The results as listed also indicate, as stated previously, that maximum speed of drawing can be maintained to provide full-scale production if all quality controls are followed.

★ ★ ★

Our standard mill coil is approximately 300 lbs., and all bundles are welded at the wire drawing frame. The wire drawer is responsible for cutting such welds when bundles are stripped from the wire block. Since the majority of high carbon commodity wires are specified to exacting and close mechanical properties, the first few coils drawn are tested immediately to determine if the specification has been met. Subsequent full-scale testing is accomplished in the Bundling Room prior to shipment.

Galvanizing

Since Galvanized Steel Core Wire For Aluminum Conductors, Steel Reinforced (ACSR), is normally specified to exacting weights, provisions can be made to roll 420 lb. rod coils on certain sizes or, if this is not possible, welding is exercised prior to patenting. Automatic counters are provided to control bundle weights at the Wire Mill prior to galvanizing. Bright wire tensile strength controls for this commodity wire are maintained to provide a loss of 10% during galvanizing. We employ hot dip galvanizing exclusively, and all such wire is charcoal wiped in order to meet the requirements of Type III weight coatings. Since such wire is specified to exacting minimum requirements as to tensile strength, yield strength, elongation, and wrap tests, we maintain our lead dip at a maximum length of two feet. This is usually sufficient to effectively remove the wire drawing lubricant and enables the acid cleaning unit to produce the surface necessary for good galvanizing. Representative tests are immediately run to make certain that all points of the specification are being met. Full-scale testing again is accomplished in the Bundling Room prior to shipment.

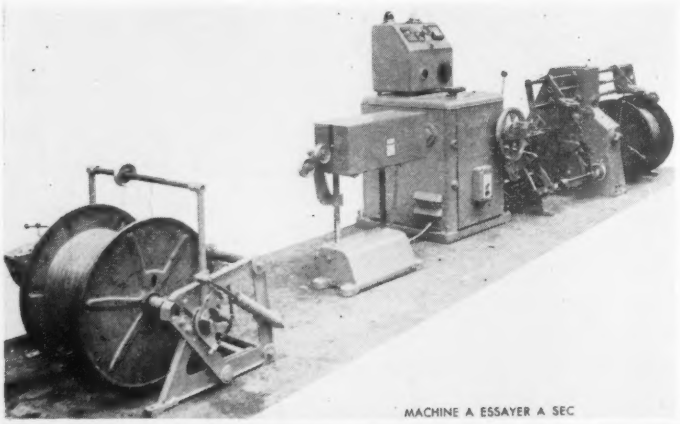
Oil Tempering

To provide a quenched and tempered spring wire, we are equipped with two oil tempering units to produce oil tempered wire in sizes from .062″ to .500″. Since such wire must be more suitable for precision forming and coiling operations than hard drawn spring wire, it is evident that exacting quality controls must be exercised to develop certain inherent uniform qualities such as toughness, tensile strength, and superior straightness to withstand the se-

THE BEST TESTER . . .

FEATURES:

- Automatic brake on the let-off device by means of hydraulic couplings.
- Adjustable tension on the drive device by means of hydraulic couplings.
- Adjustable linear speed up to 787 feet per minute.
- Handling up to 24 to 30 inch flange diameters on pay-off and take-up devices.
- Up and down device with air pressure.
- Single or double take-up.
- Electric counter stopping the machine when a predetermined length is reached.



MACHINE A ESSAYER A SEC

- Spark tester with a high voltage, from 3000 to 15000 volts, acting on a lamp, a volt counter and a buzzer.
- Traverse adjustable in speed and in length.
- The main advantage of our Spark Testing Machine is the very slow start (hydraulic couplings) allowing the making of dielectric tests on very fragile cables.

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vere bends, high stresses, and resistance to wear and abrasion required by the ultimate user.

★ ★ ★

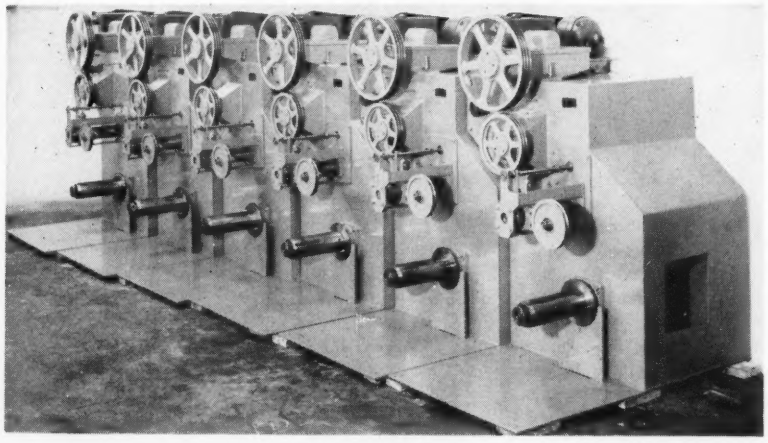
The physical dimensions of these two units are listed in Chart V. It must be stressed that for proper control of quality, a constant exit temperature must be maintained for uniform quenching. For this reason, the steel wires must be provided with an adequate soak at temperature to provide the uniformity desired. Since a blued scaled finished is important, proper atmospheric control must be exercised, and we maintain one that is slightly oxidizing. Periodic checks are made to maintain efficient micromax controls on all heating units. For complete quenching, it is imperative that the quench oil pan be as free as possible from water or foreign substances. Since all heats are melted to uniform chemistry ranges, the draw lead pan temperature requires only slight adjustments. Interchangeable sinkers of the insert roller type are employed on the lead pans for both units. When size or heat changes are necessary, shoestring samples are inserted to determine the final adjustments needed, and with the quality controls in effect, we have found that it is possible to control the resulting tensile strength to very close ranges. As a protective coating, we use a water soluble oil of approximately 15% concentration, and block sizes range from 24 to 60 inches to provide the straightness and quality necessary in such wire. Each coil is tested as it is removed from the blocks and prior to bundling.

CHART V

	No. 1 Unit	No. 2 Unit
Length of Preheat PB Pan	14 Feet	14 Feet
Length of Furnace	37 "	18 "
Length of Draw PB Pan	30 "	23 "
Effective Length of PB Pan	20 "	14 "

★ ★ ★

The one quality stressed in all spring manufacture is uniformity of performance. Any quality control program should be instituted



MULTIPLE WIRE TAKE-UP NO. 1049

An assembly of 6 individual units, each reel-arbor torque motor driven. For use in wire tinning outfits, etc.

Constant wire speed by motor driven capstans.
Each traverse adjustable for width and pitch.
Reels held on expanding arbors.
Air ejector for reels.
Welded steel construction.
Ball-bearing mounted throughout to suit, up to 30" reels.
Capacity —
Many other models, including single unit and multiple units, horizontal, vertical, or inclined.
Let-offs with adjustable torque motor or friction tensions.
Spinner let-offs with wire tension adjustable while in operation.

WIRE DRAWING, ENAMELING, TINNING, INSULATING, TAPING, GLASS-COVERING, PANNING, AND ALLIED MACHINERY.

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with this goal in mind. We have outlined a series of control checks for quality within an integrated steel plant, and present results have indicated that such controls have resulted in high carbon wire of uniform quality.

Reliance Electric Adds Man in Philadelphia

Appointment of an additional sales application engineer **H. Bigelow Moore,** to the staff of the Philadelphia district sales office of the **Reliance Electric and Engineering Company,** Cleveland, O., has been announced by C. V. Gregory, manager of district sales of the Company. The appointment was made in April.

★ ★ ★

Born in Springfield, Massachusetts, Mr. Moore joined the Reliance organization in November, 1953, coming from Pittsburgh where he headed industrial sales for the Nickel Cadmium Battery Company.

Observations on the Effects of Pre-Plating Hot Galvanized Steel Wire

(*Continued from page* 634)

not capable of determination at 2000x. We do gather the impression, however, that the pre-plated samples, and in particular the nickel pre-plated samples show slightly more uniform structure than the the unplated steel specimens.

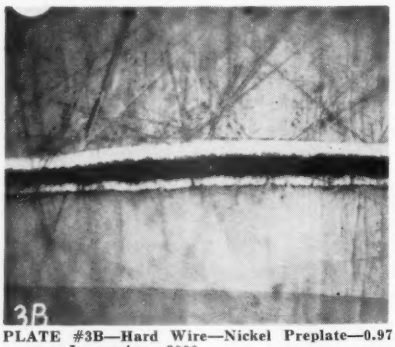

PLATE #3B—Hard Wire—Nickel Preplate—0.97 sec. Immersion x2000

Plates #4 and #5 show the adherence of the galvanized coating to the basis steel after changing the .048 round wire to .060 x .020 flat. In this operation the continuity of dark central area of the coating has been disrupted, but at no point on the flat surface has the coating parted from the basis

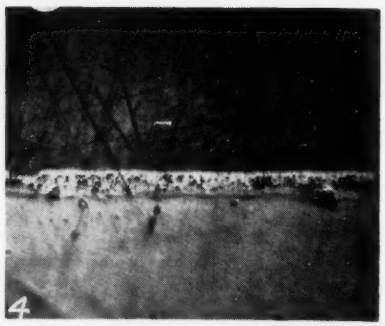

PLATE #4 — Hard Wire — Zinc Preplate — Flat Rolled after 2.24 sec. Immersion x2000

PLATE #5—Hard Wire—Nickel Preplate—View of Corner of Flat Rolled Wire After 2.24 sec. Immersion x2000

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Wire Netting Machines for Chain Link, Hexagonal Mesh, Poultry Netting, Field Fence. Crimping, Barb Wire and Staple Machines. Spring Coilers. Spring End Grinding Automatics. Loop Benders. Upholstery Spring and Wire Mattress Machines. Wire Nail Machinery. Chain Formers. Chain Welders. Straightening and Cutting Machines. Multi-Slide Wire and Strip Forming Machines. Special Machinery for the making of Paper Clips, Lock Washers, Bale Ties, Key Rings, Tin Openers, Wire Bag Ties, etc. Automatics for Flexible Metallic Tubing.

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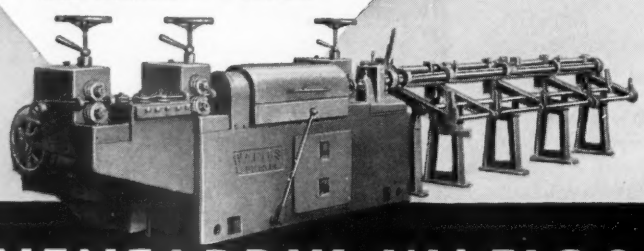

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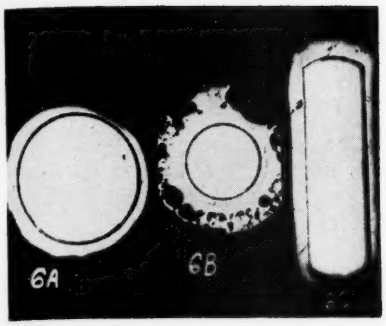


PLATE #6—Illustration of Changes in Shape of Wire x100
A-.048 Round—Original Size B-.022 Round-Drawn Size C-.060 x .020 Flat-Rolled Size
Sizes B, and C Derived from A

metal. With Plate #5 showing the conditions at a corner, the dark areas do not show parting of the coating from the basis metal.

★ ★ ★

Plate #6 is included to more readily visualize the effect of changes in shape by drawing and rolling of these galvanized wires. "A" illustrates diameter of .048 wire, "B" diameter of patented and drawn wire and "C" the shape of the rolled wire.

Conclusions

It is obvious that the use of a pre-heater with flux coated wire, and flux coated and preplated wire, permits much shorter immersion times and with it gives coatings susceptible of great change in form which maintain adherence to basis steel. Under conditions existing in this pilot line, the advantages of pre-plate are not too apparent. However, it is felt that when this sort of procedure is developed for broader commercial use, that control of surface alteration of the wire in the pre-heater may be more difficult, and then the pre-plate would show to distinct advantage. No disadvantage whatsoever has resulted from the use of the pre-plates.

Rope Firm Building New Plant

Wright's Canadian Ropes Ltd., Granville Island, Vancouver, B. C., will shortly start the construction of a new million dollar wire rope factory, to replace its present plant.

Manufacturer's Wire

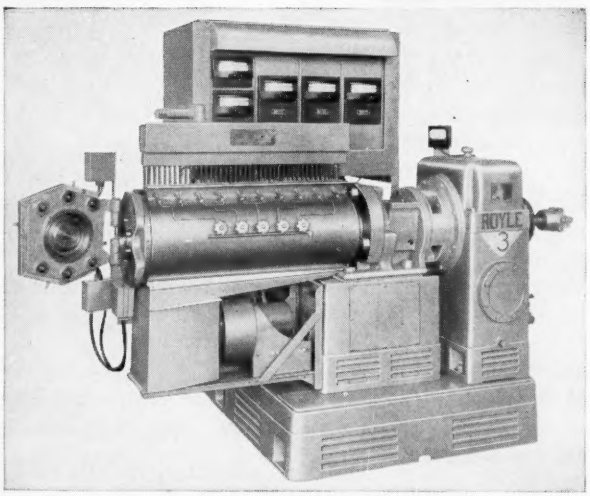
(*Continued from page* 630)

fillment of the wire maker's expectation to furnish a wire of satisfactory workability.

★ ★ ★

The growth of the great number of special purpose Manufacturer's Wires that we now make—six varieties of High Carbon Spring Wire for Upholstery constructions alone—attests to the ingenuity of all wire men from the cleaning house to the bundling room, with a passing bow to the steel and rod producers. Development of these wires has played a tremendous part in our industrial growth because the combinations of Strength, Workability, and other desirable properties, in a wide range of sizes, at an economical cost offer a material for a tremendous number of applications that can be duplicated by no other steel product.

FASTEST HEATING FASTEST COOLING



Here are some of the time-tested, money-saving reasons more and more plants are standardizing with Royle Spirod* Extruders for processes requiring maximum flexibility in controlled temperatures — constantly maintained and accurately zoned:

- **Extra heavy walled cast steel cylinders that will not warp. No joints to leak when pressures are high or crevices to collect burned compound that would cause contamination.**
- **Heavy duty large diameter heating elements, that can be used with 440 volts without step-down transformers, provide radiant heat to cylinders and heads.**
- **Any heating element may be removed and replaced without disturbing other elements or wiring.**
- **A cooling system with ten times the capacity of conventional designs can be modulated through its entire temperature range without drastic changes. Ample cooling for all compounds at maximum speeds.**

No. 3 Royle Spirod Extruder. Completely insulated and equipped for evaporative cooling.

*Patent Applied For

JOHN ROYLE & SONS

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PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

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Los Angeles, Cal. — H. M. Royal, Inc. — LOgan 3261

PATERSON 3, NEW JERSEY

IDA Exhibits at ASTE Show

The Industrial Diamond Association of America, 124 E. 40th St., New York, had an excellent educational exhibit at the Tool Show in Philadelphia during the week of April 26th, in which various applications of industrial diamonds to industry's needs were shown.

★ ★ ★

One section of the exhibit was concerned with diamond wire drawing dies, which were strung on various gages of wire, from intermediate sizes down to fine wires smaller than a human hair in diameter. The wires shown were types used for lamp filaments, armature winding, electric cables, etc.

★ ★ ★

Another section, the slogan "There is a Diamond Mine in Your Shop," exhibited collections of diamond bearing sludge, scarf, and scrap (broken diamond wheels, etc.) that offer profitable opportunity for the reclaiming of diamond particles and powders.

★ ★ ★

Literature was available showing where the various types of products could be obtained or operations like diamond powder reclaiming performed.

★ ★ ★

The exhibit was set up by and was in charge of **Athos D. Leveridge,** Executive Manager of the Association.

Restrictions Lifted on Purchases of Hy-Therm Copper

Hy-Therm Copper conductors, which for some time have been in limited supply due to restrictions imposed by copper allocations, are now available to all purchasers, according to **David E. Allen,** General Sales Manager, **Anaconda Wire & Cable Company.** This exclusive Anaconda product finds wide application in bare and weatherproof conductors used in overhead transmission and distribution due to greater permissible thermal rating.

★ ★ ★

By virtue of the increased resistance to annealing, Hy-Therm Copper permits higher current carrying capacity and longer useful life under load, with no loss in conductivity. Its characteristics enable continuous and short-time current carrying capacities of overhead lines to be calculated more accurately. This is important for overhead conductors which are often designed and installed according to pre-determined sags and tensions.

★ ★ ★

Included in the announcement was the fact that all Anaconda mills manufacturing bare and weatherproof wire are now in a position to furnish Hy-Therm Copper conductors.

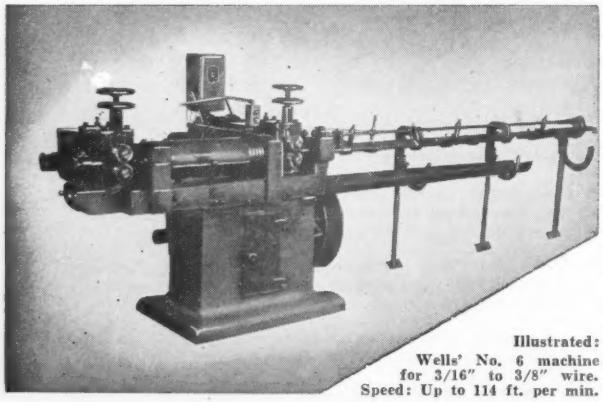
Packard Electric Installing New Wire Rod Mill

The Packard Electric Co., Warren, Ohio, Division of General Motors, has ordered a new type Wire Rod Mill from Loewy Rolling Mill Division of **Hydropress, Inc.,** in New York. The mill, consisting of two Breakdown and seven Continuous Finishing Stands, is scheduled for operation at the end of 1954.

What do you want in your

STRAIGHTENER and CUTTER?

- **DEPENDABILITY?** **WELLS machines provide day-in, day-out continuous operating service.**
- **SPEED?** **These automatic rotary machines will not only give you speed, but accuracy as well.**



Illustrated: Wells' No. 6 machine for 3/16" to 3/8" wire. Speed: Up to 114 ft. per min.

Cuts wire in any length from 7½" up to 25'. Special attachment furnished on order for long lengths. Straightener flier runs in ball bearings. Gear drive and motor enclosed in base. Door provides accessibility.

58 years of experience and continuous engineering, with use of finest materials, have put WELLS machines in a class by themselves for excellence of performance. Built to handle the toughest jobs, year after year, with little or no servicing. Supplied in a complete range of sizes.

Send for Catalog covering the full line.

Frank L. Wells Company

KENOSHA • 5821 Fifth Avenue • WISCONSIN

Builders of Fine Wire Working Machinery

American Silver Enters Thermostat Metal Field

The entry of **American Silver Company, Inc.** into the thermostat metal field has been announced by Monroe Sherman, President. Heading the new Thermostat Metal Division is **Stanley R. Hood,** long a recognized authority in the field, having been responsible for a number of developments for bimetal application.

★ ★ ★

The establishment of the Thermostat Metal Division represents another important step in the company's program of diversification, aimed at broadening ultimate markets. With a successful background in the rolling of precious metals for the jewelry industry, 3 years ago American Silver set up an Industrial Division which has been producing high-precision ferrous, non-ferrous and precious metal strip of all kinds. Very close tolerance and ultra-thin gauge metals are finding wide application in the aircraft, electronics, communications and instrumentation industries—where miniaturization has become the keynote in design.

Anticipates Increased Sale of Electric Wire

At least a 50% increase in the **Crescent Company's** sale of wire this year to air-conditioning manufacturers was forecast by **John M. Sapinsley,** President of the Pawtucket, Rhode Island, wire and cable manufacturing firm. Mr. Sapinsley, speaking at a sales meeting, based his prediction on orders already received by his company for the heavy-duty wiring required for air-conditioning installations.

★ ★ ★

"Our wire cords for air-conditioning equipment have received excellent ratings from the industry," declared Mr. Sapinsley. "With volume in air-conditioning home units scheduled to approach two million in 1954, our wire sales will more than keep pace with this growth. Orders for air-conditioning manufacturers, heretofore not our customers will account for our big sales rise."

★ ★ ★

Different types of cords for air-conditioning installation are manufactured by the Carol Company Division of Crescent. "A good portion of our new orders may be due to the care which we take in answering the needs of the appliance manufacturers when special problems arise. For extreme conditions of heat and sunlight, or where abrasion is a problem, a neoprene compound specially blended in Crescent's laboratories is supplied," said Mr. Sapinsley. Wire cords of different strandings manufactured from soft annealed copper are available.

The Crescent Company manufactures a wide variety of wire and cable for the industrial and automotive fields, including welding, tool and appliance cords. In the past few years, Crescent has embarked on an expansion into the industrial field, setting up The Carol Company Division to handle this market.

Work on A S & W's New Rod Mill Started

With the sale of seven and a half acres of City of Cleveland property at the foot of E. 42nd St., and Harvard Ave., to **American Steel & Wire, Harry L. Jenter,**

WILLEY'S
TUNGSTEN CARBIDE

METALS
DIES
TOOLS
for the Wire Industry

Rough Cored Standard Dies
(from stock)
ROUND SQUARE HEXAGON OCTAGON

Rough Cored or Finish Ground
(Immediate quotations on receipt of your prints—
Fast delivery schedules)
SPECIAL DIES WEAR PARTS MANDRILS
NIBS—HEADING AND EXTRUSION DIES

For complete information:

Willey's Carbide Tool Co.
1340 W. VERNOR HWY. • DETROIT 1, MICHIGAN

Cleveland district manager of operations for this **U. S. Steel Division,** announces that construction of the Division's new rod mill will swing into high gear. Earlier this year American Steel & Wire announced the award of a contract for the machinery and equipment for the rod mill to the **Morgan Construction Company** of Worcester, Mass.

★ ★ ★

The newly acquired property lies north of the Wire Division's huge Cuyahoga Works where the rod mill is being built. The acreage will be used as a parking lot for the plant's more than 3,000 employees.

★ ★ ★

The new facilities will include a combination rod mill, billet storage area, and rod storage area. The new mill will incorporate the latest facilities, equipment, and methods to effect maximum efficiency and production and further increase the quality of the Wire Division's products.

★ ★ ★

Electronic and the latest automatic controls will be used extensively in the heating, rolling and cooling processes in the new mill to produce a quality product at mile-a-minute speeds.

★ ★ ★

Steel billets which must be heated before being rolled into rods, will be conveyed through a billet reheating furnace divided into multiple heat zones whose temperature will be closely controlled. The new facilities will handle billets 3¼ inches square and 30 feet long, weighing about ½ ton each.

★ ★ ★

Using a combination of roll or reducing stands, the new mill is expected to send the rod speeding to the coiling reels at a rate in excess of sixty miles an hour. This is in contrast to present equipment where speeds range up to thirty-five miles an hour.

★ ★ ★

The roll stands will be so arranged and equipped with fingertip controls and electronic measuring devices that the rod will literally "float" through the reducing mills. This will insure maximum accuracy in maintaining roundness and size. Rolling range of the new rod mills will be from No. 5 rod (which is about 7/32 of an inch) to 1½ inches.

★ ★ ★

This new high speed rod rolling and handling equipment plus increased bundle weight will in turn enable customers of American Steel & Wire to achieve improved efficiency in the further processing of rods from this mill.

Announce New Literature on X-Ray Analysis of Metals

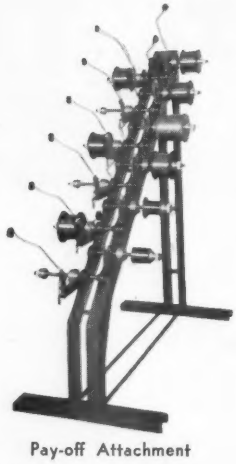
A new 4-page folder titled "X-ray Diffraction Proves Valuable Research and Production Tool to Evaluate Properties of Metals" is available gratis from the Research & Control Instruments Division, **North American Philips Company, Inc.,** 750 South Fulton Avenue, Mount Vernon, N. Y.

★ ★ ★

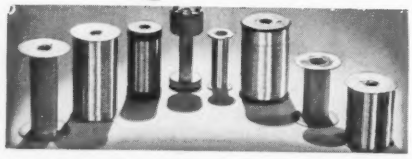
STANDARD UNI-DRIVE WIRE WINDER.

INCREASE YOUR PRODUCTION
WITH THIS WINDER

Wire Winder



Pay-off Attachment



Various types of supply packages that may be wound on Standard Uni-Drive Wire Winder.

PAYOFF

Our payoff attachment is made with self-aligning ball bearings and a compensating attachment to control the tension of each end. Applies same tension when spool is empty as when full.

The new Uni-Drive Winder with Payoff Attachment is new in design and incorporates several improved and tested features. Production is stepped up through increased speed. It produces smooth, even and accurately wound spools of wire in single or multiple ends. All strands parallel—no over or under-winding. Automatic Stop-Motion controls each strand. Compensating attachment produces perfectly controlled tension. Traverse adjustable from 1¾" to 5½" between spool heads without changing cam. Designed especially for winding wire to be braided and shielded for electrical conductors up to ¾" diameter.
Payoff can be equipped with Carboloy Guide Inserts at additional cost.

STANDARD MILL SUPPLY COMPANY
PAWTUCKET, RHODE ISLAND, U.S.A.
1064-1080 Main St.
PAwtucket 3-1534 — 3-1535 — 3-1536

The material was prepared by **Dr. Gustav Albrecht,** Consultant, Los Angeles, California, and discusses the basic three X-ray analysis methods which are employed in solving problems concerning properties of metals.

★ ★ ★

Well illustrated with photos, drawings and charts, the new folder covers such subjects as stress and strain analysis, determination of preferred orientation, determination of grain size, and phase diagrams.

Diamond Concern Expands

The paradox of increasing business and sliding prices is one of the reasons attributed to the recent expansion program launched by **Diamond Tool Research Co., Inc.** Another is a long-range research program designed to find new uses for industrial diamonds, a program that is beginning to pay dividends.

★ ★ ★

The company's expansion program recently caused them to move to new quarters with a 400% increase in space as well as a corresponding increase in production and research facilities.

★ ★ ★

The greater availability of industrial diamonds has sharply increased its use for grinding, shaping and polishing very hard materials (tungsten carbides), deep core drilling, especially for oil, and as an abrasive.

★ ★ ★

Willard L. Huber, manager of Diamond Tool Research Co., predicts ever increasing business as wider applications for diamond products are developed, due to the fact that the diamond is the hardest material known to man and fashions hard materials into wanted sizes, shapes and finishes faster than any other abrasive.

Booklet on Carton Staplers

A new eight-page booklet on operation and specifications of the International Staple Knight stapling machine series has just been published by **International Staple & Machine Co.,** Herrin, Ill. Data on the staplers, which close corrugated or fibre cartons, includes illustrations and diagrams, with an explanation of the operation of Retractable Anvil stapling heads used on all of the company's stapling equipment.

★ ★ ★

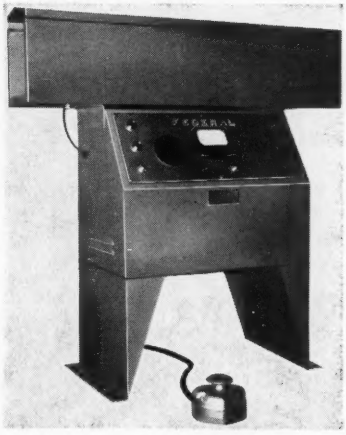
Prices, ranging from $75 to $575 are listed for the series of manually operated Boxer and two pneumatic models. Among the eleven major points listed are speed of operation, security and pilferproof features of the fastenings, concealed clinching, ease of loading and operating. Applications of the machines, for either light or heavy packaging needs, as well as sizes of cartons that each machine can handle, are detailed.

★ ★ ★

Copies are available from International Staple & Machine Company, 801 Herrin Street, Herrin, Illinois.

The 1954 Edition of the
WIRE & WIRE PRODUCTS
BUYERS' GUIDE
IS ON SALE.

GOOD NEWS for ELECTRIC WIRE MILLS



THE FEDERAL RE-SPOOLING SPARKER

Model RS15 (15,000 volts) sells for 20% less than any other sparker on the market. Picture at left.

FURNISHED COMPLETE WITH:

- Slow start control for motor.
- Jog and automatic knock-off.
- Wide sweep scale meter.
- Fused circuit. All wires code marked for easy maintenance.
- Electrodes for up to any speed desired.
- Lowest price, but with all features found in any standard equipment.

BUILT TO MEET ALL SPECIFICATIONS

Other Federal Equipment:

PAY-OFFS
TAKE-UPS
RE-SPOOLERS
CAPSTANS

TESTING EQUIPMENT
FOR INSULATED WIRE:
Dielectric and high potential
FOR ENAMELED WIRE:
Continuity
Dielectric
Abrasion scrape

Export Agents: BALLTHRALL TRADING CO., PHILADELPHIA, PA.

WIRE MACHINERY • TESTING EQUIPMENT
THE FEDERAL MANUFACTURING CO.-WALLINGFORD, CONN.
Telephone: 9-4213

Source: American Iron and Steel Institute

Covering Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or for Resale) * Revised.

STEEL PRODUCTS	Items	Current Month MARCH - 1954					To Date This Year				
		Carbon	Alloy	Stainless	Total	Per cent of Total Shipments	Carbon	Alloy	Stainless	Total	Per cent of Total Shipments
Ingots	1A	18,400	14,862	2,467	35,729	0.6	* 56,804	39,362	5,695	* 101,861	0.6
Blooms, slabs, billets, tube rounds, sheet bars, etc.	1B	96,010	28,688	979	125,677	2.2	* 306,064	84,376	* 3,195	* 393,635	2.4
Skelp	2	6,313	-	-	6,313	0.1	28,052	-	-	28,052	0.2
Wire rods	3	58,748	1,216	350	60,314	1.1	* 170,455	3,760	1,090	* 175,305	1.0
Structural shapes (heavy)	4	434,240	2,647	6	436,893	7.8	1,340,180	7,805	28	1,348,013	8.1
Steel piling	5	36,529	-	-	36,529	0.7	95,926	-	-	95,926	0.6
Plates	6	520,523	22,063	1,391	543,977	9.7	* 1,571,316	61,652	4,078	* 1,637,046	9.8
Rails—Standard (over 60 lbs.)	7	154,462	-	-	154,462	2.8	494,136	113	-	494,249	3.0
Rails—All other	8	11,423	-	-	11,423	0.2	27,816	-	-	27,816	0.2
Joint bars	9	9,003	-	-	9,003	0.2	26,119	-	-	26,119	0.2
Tie plates	10	27,390	-	-	27,390	0.5	89,581	-	-	89,581	0.5
Track spikes	11	8,498	-	-	8,498	0.2	23,244	-	-	23,244	0.1
Wheels (rolled & forged)	12	23,165	114	-	23,279	0.4	69,182	218	-	69,400	0.4
Axles	13	6,233	16	-	6,249	0.1	21,314	63	-	21,377	0.1
Bars—Hot rolled (incl. light shapes)	14	424,431	118,174	3,476	546,081	9.8	1,294,121	360,638	9,173	1,663,932	10.0
Bars—Reinforcing	15	124,783	-	-	124,783	2.2	348,144	-	-	348,144	2.1
Bars—Cold finished	16	87,121	14,822	3,303	105,246	1.9	262,551	46,057	9,678	318,286	1.9
Tool steel	17	1,305	7,149	-	8,454	0.2	3,718	20,284	-	24,002	0.1
Standard pipe	18	184,318	16	-	184,334	3.3	516,105	28	5	516,138	3.1
Oil country goods	19	181,540	27,355	-	208,895	3.7	536,124	69,080	-	605,204	3.6
Line pipe	20	264,981	3	-	264,984	4.7	684,266	4	-	684,270	4.1
Mechanical tubing	21	48,846	13,977	361	63,184	1.1	143,126	45,569	1,169	189,864	1.1
Pressure tubing	22	21,281	4,264	1,267	26,812	0.5	63,517	12,485	5,339	81,341	0.5
Wire—Drawn	23	190,378	2,504	1,755	194,637	3.5	* 524,699	8,124	* 4,805	* 537,628	3.2
Wire—Nails & staples	24	50,613	-	-	50,613	0.9	129,732	-	2	129,734	0.8
Wire—Barbed & twisted	25	18,396	-	-	18,396	0.3	40,489	-	-	40,489	0.2
Wire—Woven wire fence	26	38,906	-	-	38,906	0.7	88,999	-	-	88,999	0.5
Wire—Bale ties	27	3,316	-	-	3,316	0.1	7,213	-	-	7,213	-
Black plate	28	56,442	-	-	56,442	1.0	165,862	-	-	165,862	1.0
Tin & terne plate—hot dipped	29	120,471	-	-	120,471	2.2	309,633	-	-	309,633	1.9
Tin plate—Electrolytic	30	354,233	-	-	354,233	6.3	968,989	-	-	968,989	5.8
Sheets—Hot rolled	31	456,482	17,876	1,122	475,480	8.5	1,485,315	47,083	* 3,058	* 1,535,456	9.2
Sheets—Cold rolled	32	742,171	4,507	7,706	754,384	13.5	2,413,049	12,764	* 20,538	* 2,446,351	14.7
Sheets—Galvanized	33	180,028	170	-	180,198	3.2	516,547	170	-	516,717	3.1
Sheets—All other coated	34	15,589	-	-	15,589	0.3	42,582	-	-	42,582	0.3
Sheets—Enameling	35	16,729	-	-	16,729	0.3	44,662	-	-	44,662	0.3
Electrical sheets & strip	36	9,132	44,373	-	53,505	1.0	26,833	141,100	-	167,933	1.0
Strip—Hot rolled	37	118,602	1,706	103	120,411	2.2	* 358,574	4,460	463	* 363,497	2.2
Strip—Cold rolled	38	95,711	1,198	14,962	111,871	2.0	* 300,391	3,221	43,800	* 347,412	2.1
TOTAL	..	5,216,742	327,700	39,248	5,583,690	100.0	*15,595,430	968,416	* 112,116	* 16,675,962	100.0

CAMDEN WIRE CO., INC.

Wire Fabricators

BARE OR TINNED COPPER WIRE AND STRAND

GALVANIZED STEEL WIRE AND WIRE ROPE

40 Masonic Avenue • Camden, New York

New Instrument Makes Both Regular and Superficial Hardness Tests

An instrument that can make both regular and superficial Rockwell hardness tests has been developed and manufactured by **The Torsion Balance Company,** Clifton, New Jersey. The new instrument, designated as the **Kentrall Hardness Tester,** is the first machine designed to make tests utilizing all scales.

* * *

In its dual function, this tester makes all regular Rockwell tests (60, 100 and 150 kg. loads) and superficial tests (15, 30 and 45 kg. loads) with any suitable standard "C", "N" or Ball type indenter. All results show on a direct, easy-reading dial gauge with a single numerical scale.

* * *

Minor and major loads are applied by dead weights, instead of springs. Stops inserted on the sides of the column facilitate changes in test loads. The major load being used is indicated by the location of the stops. It is built in several capacities.

* * *

Further information may be secured by writing the company.

Teflon-Impregnated Lacing Cord and Tape Announced by Hitemp Wires

NEBROC lacing cord and tape, especially suited to high temperature applications, has just been marketed by **Hitemp Wires Inc.,** Mineola, L. I. Manufactured in yarn, thread, cord and tape dimensions, NEBROC consists of high grade continuous-filament Fiberglas thoroughly impregnated with a uniform film of Teflon. In addition to its many other desirable characteristics, the Teflon coating serves as a lubricant, this preventing single filaments from severing each other when cords are flexed or knotted.

* * *

The new product withstands temperatures from -90° to 260°C, has high tensile strength, is non-flammable, will not support fungus growth and is chemically inert to all known commercial solvents. For example, the .020″ diameter cord has a straight strength of 69.5 lbs. min., loop strength of 17.5 lbs. min., and knot strength of 15 lbs. min.

* * *

Current applications are in tying coils, motor windings and harness lacing that are to be impregnated with high temperature varnishes. The Teflon-Fiberglas combination retains its physical and electrical characteristics even under the most strenuous impregnating process. Other uses are expected in sewing canvas articles, shoes, luggage and similar products.

* * *

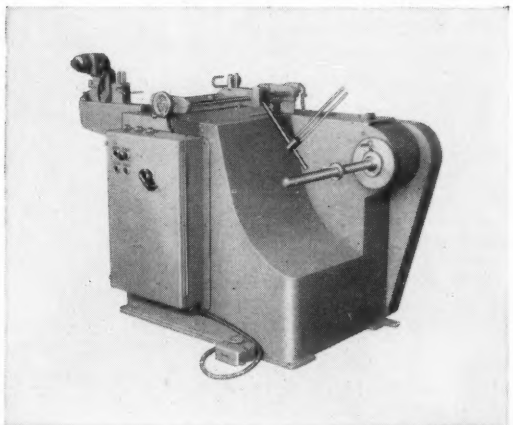
The cords are furnished in a wide range of sizes and colors. Inquires should be addressed to Hitemp Wires Inc., 26 Windsor Ave., Mineola, L. I.

* * *

WIM

Engineered for Performance

WIM equipment combines practical design and rugged construction in a line of smooth operating wire handling machines. An example is the WIM Model A Respooler. Here is a conservatively engineered and precisely built high speed machine. Operating simplicity is stressed and dependable performance is featured. Write today for further information. Our engineering staff will be glad to help work out your special problems.

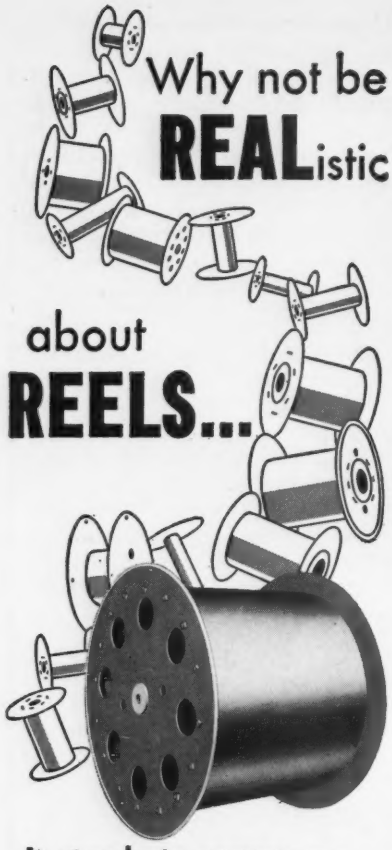


WIM MODEL A RESPOOLER

WIRE INSULATING MACHINERY, INC.

Division of Machinery Electrification, Inc.

Northboro Mass., USA



Why not be REAListic about REELS...

It stands to reason that a company that's been doing a specialty job for more than 50 years really has the hang of it.

Apco Mossberg Company, for over a half century, has been everlastingly at the job of providing manufacturers of copper wire, steel wire and wire rope with all types and sizes of high quality steel reels, spools and bobbins.

Apco trained engineers consider each and every inquiry regarding steel spools, reels or bobbins separately . . . give individual attention to the design and construction to make certain that customers' requirements are carried out to the letter.

Reels are available in all sizes and shapes . . . for all applications. Write for further details today.

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Toronto, Ontario, Canada

The original Frank Mossberg Company

APCO MOSSBERG COMPANY
ATTLEBORO, MASS.

Evaluation of Natural and Synthetic Rubbers for Insulated Wires and Cables

(*Continued from page* 643)

tically the same as "hot" GR-S, confirming what would be expected from the toughness of natural in the pure gum state, and its being quite a bit more thermoplastic than synthetic rubbers. Correlation of this information was observed in factory Banbury mixes, but the wider random variations in power swings rendered such observations less reliable. A more detailed study of this as applied to factory mixing would be a worthwhile contribution to the rubber technology by any rubber users.

★ ★ ★

Plasticity of rubber when masticated furnishes another interesting comparison. Peptizers are added in varying amounts, while Mooney plasticity is measured after a 10-minute mastication cycle in the Laboratory Banbury, as shown in Figure 2. The top curve of "cold" GR-S 1503 shows a rise with Peptizer B, which indicates a toughening after mastication rather than softening. This is one drawback of "cold" rubbers. Peptizer A apparently overcomes this tendency, while with "hot" GR-S 1019, the plasticity is considerably lower with Peptizer A. Here again, the tendency of "cold" GR-S to exhibit tougher processing characteristics is evident. It is attributed to gelation of the polymeric ingredients and is a detriment where close control of plasticity is maintained. Our system of quality control covers plasticity on a statistical control basis, and any departures from the norm are principal attributes in determining the fitness of compounds for use. Compounds containing "cold" rubber are notably more difficult to keep in control.

Comparative Standings of Rubber Compounds

Insulating compounds based on GR-S have superior heat resistance and moisture stability to natural rubber. While their physical test values of tensile strength modulus and elongation are lower than with

START SAVING in your Die Finishing Rooms

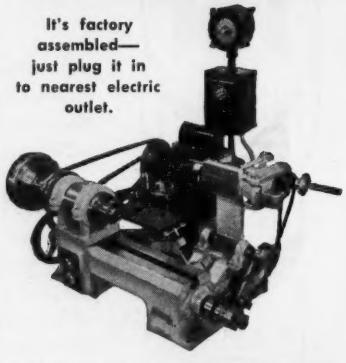
Double your Refinished Tungsten Carbide Die Production

CUT labor costs ½ with the New type "M" automatic

DYKREX
"IT CORRECTS THE DIE"

Polishing Machine

It's factory assembled—just plug it in to nearest electric outlet.



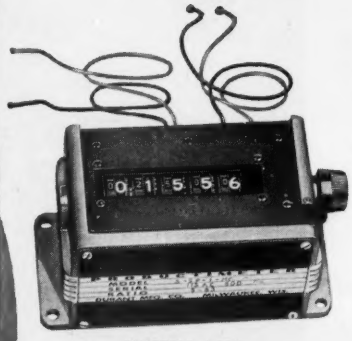
ROOS TOOL & MFG. DIVISION
Dykrex Corporation of America
manufacturers of
Wire Die Finishing Machinery
33 Bloomfield Avenue
Newark 4, N. J.

Western Union
Teletype Service
QAB-WUX—Montclair, N. J.

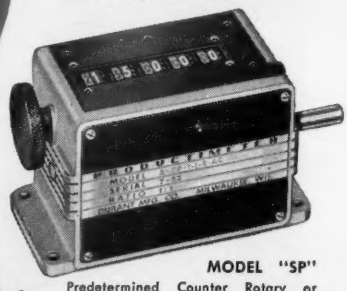
The Standard of the Wire Industry

Predetermined Runs are PROFITABLE Runs

MODEL L-R-16-Q
Wire Measuring Machine with Predetermined Counter Speed 2000 F.P.M.



ELECTRIC "SP"
Predetermined Counter Counts Electrically — Lights LIGHT, Rings BELL, Starts or Stops MACHINE.



MODEL "SP"
Predetermined Counter Rotary or Stroke Models Lights LIGHT, Rings BELL, Starts or Stops MACHINE, mechanically.

Send for Catalogs

DURANT MFG. CO.
1918 N. Buffum St. 118 S. Water St.
Milwaukee 1, Wis. Providence 3, R.I.
Representatives in Principal Cities

PRODUCTIMETERS 75th ANNIVERSARY
Count Everything

natural, these properties are usually more than adequate, and furthermore retain higher proportions of initial values with heat aging. One tendency found in natural rubber compounds is that they revert or devulcanize with severe heat aging, giving a familiar gummy feeling on being opened up. This is never seen with GR-S synthetic rubber compounds, and is a real advantage for these rubbers. The principal place where there is real advantage for natural rubber compounds is in resistance to compression, such as with armored submarine cable. By careful design of the cable itself, poor inherent ozone resistance is overcome. Insulation resistance comparisons sometimes favor natural rubber insulations, but here again, judicious compounding can make the synthetics more than adequate for specific needs.

* * *

Without attempting to particularize, it can be stated that natural rubber, GR-S, and Butyl are taking their places side-by-side in the present day usage, each within certain spheres where predominant characteristics are best used.

* * *

Buna-N, the acrylonitrile copolymer of butadiene, is available for use where extreme oil resistance is the primary requirement. It also furnishes a possibility for low temperature flexibility, but its place as a real insulation is very limited.

* * *

Silicone rubber is entering the picture for its own specialties. Silicone rubber, despite its high price, has the widest temperature range, from —90 to + 400°F., of any rubber and will be the salvation of many military applications. Hypalon, chlorosulforated polyethylene, is an interesting adaptation of a thermoplastic base material into a vulcanizable (thermosetting) dielectric with considerable promise. Incorporation of a small amount in one of our older compounds has improved its ozone resistance.

WHAT'S IN A SLOW BURN?

There's more to a slow burn than just temper.

When radio or TV hook-up wires get crossed, there may not always be sparks but there's a lot of heat generated — sometimes enough to start a good flame on the insulation.

When this sort of thing happens, the flame can be retarded and even extinguished if a NELCO saturant has been used on the insulation. Our laboratories worked long and hard to discover just the right combination of materials that would give a fire-retardant saturant that would also meet all other requirements of the radio and TV hook-up wire people.

The NELCO saturant we have developed, besides its outstanding characteristic of being a fire-retardant, has many other fine qualities. For example:

Its lightness in color makes wire more attractive, more sellable.

Its resistance to discoloration means finished wire that will not fade or become untraceable.

Its quick-drying properties, essential in mass production operations, are unequalled.

Here is another NELCO saturant, specially developed to do a tough job . . . as are all our saturants and lacquers.

When you do a slow burn over inefficient saturants, write to us for help. We're used to finding just the right solution for other people's problems.

NEW ENGLAND LACQUER CO.

150 King Philip Rd., East Providence, R. I.

BETTER WORKING CONDITIONS
FASTER BUTT WELDING
FASTER ACID NEUTRALIZING
LONGER STORAGE SAFETY
YOU GET THEM ALL WITH
BORAX 5 MOL.
RUST INHIBITOR COATING
LONGER DIE LIFE
...and ONE DIP is all that is necessary for coating steel rods
BORAX 5 MOL offers worthwhile advantages over regular borax as a satisfactory coating material on ferrous rods and wire in preparation for dry drawing. This newer material offers a higher concentration of sodium borate and therefore savings may be realized through reduced transportation, handling, and storage costs. Only about three-fourths as much Borax 5 Mol need be used to equal regular borax... yet you get the same worthwhile results!
WRITE FOR YOUR COPY OF NEW SERVICE BULLETIN
PACIFIC COAST BORAX CO.
DIVISION OF BORAX CONSOLIDATED, LIMITED
NEW YORK • CHICAGO
LOS ANGELES • CLEVELAND
PHILADELPHIA
MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS

Conclusions

We have attempted to show the important comparisons between natural and synthetic rubber. We need them both for many specific uses. To a large extent, they are interchangeable, with processability and quality being the principal determinants.

* * *

By compounding to obtain optimum properties with any of the available materials, the wire and cable industry is in a much better position than before the war. We must watch carefully and press vigorously for further improvement in GR-S and Butyl synthetic polymers. The conversion to private ownership of the synthetic rubber industry offers interesting possibilities for competitive advances in the art far beyond that already achieved.

* * *

The resulting situation of being able to design compounds around the customers' more exacting requirements is a very healthy one and augurs well for the wire and cable industry in being able to meet today's challenge for even greater reliability and economy.

New Catalog on Electric Motors

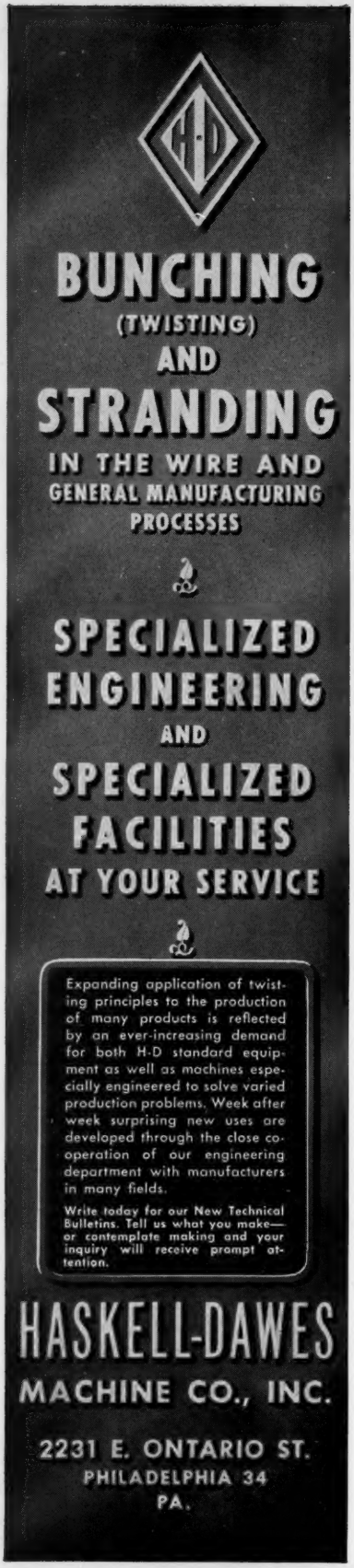
Designed to help in quickly choosing Reliance squirrel cage induction motors, both the new line and the current line, for applications ranging from 1 to 200 horsepower, a colorful, 12-page bulletin (B-2102) has just been issued by **The Reliance Electric and Engineering Company,** 1008 Ivanhoe Rd., Cleveland, 10, Ohio.

* * *

Termed a "Motor Selector," the new bulletin lists performance characteristics, construction features, dimensions, price, and other information essential in ordering the "right motor for the job."

* * *

Copies of the bulletin are available upon request from The Reliance Electric and Engineering Company, 1076 Ivanhoe Road, Cleveland 10, Ohio.


H-D
BUNCHING
(TWISTING)
AND
STRANDING
IN THE WIRE AND GENERAL MANUFACTURING PROCESSES
SPECIALIZED ENGINEERING
AND
SPECIALIZED FACILITIES
AT YOUR SERVICE
Expanding application of twisting principles to the production of many products is reflected by an ever-increasing demand for both H-D standard equipment as well as machines especially engineered to solve varied production problems. Week after week surprising new uses are developed through the close cooperation of our engineering department with manufacturers in many fields.
Write today for our New Technical Bulletins. Tell us what you make—or contemplate making and your inquiry will receive prompt attention.
HASKELL-DAWES
MACHINE CO., INC.
2231 E. ONTARIO ST.
PHILADELPHIA 34
PA.

7 out of 9

WIRE MILLS

that Liquor Finish Wire

use STANNOUS SULFATE *because*

Tin Losses Are Reduced . . .

by elimination of high tin sludging due to incomplete reaction in feather tin method.

Results Easier to Control . . .

only two variables to watch — Stannous Sulphate and Copper Sulphate — allows immediate, simple color adjustment.

Every Batch the Same . . .

M&T Stannous Sulphate method produces smooth, uniform wire coatings, unvarying from lot to lot.

See how use of M&T Stannous Sulphate can help you save tin in liquor finishing. Write for engineering data.

METAL & THERMIT CORPORATION

Chemical Division

100 E. 42nd St., New York 17, N. Y.

Specialists in Tin and Tin Chemicals

Alloy Metal Builds Plant Addition, Adds Equipment

Alloy Metal Wire Company, Division of **H. K. Porter Company, Inc.,** has completed and is now using a new addition to their plant in Prospect Park, Pennsylvania. At the same time announcement has been made that additional gas cracking capacity will be added in the near future and a 4-high Steckel Mill is being installed to increase production of high quality nickel alloy and stainless steel strip.

★ ★ ★

The additions to the plant and equipment are in line with the policy of the Porter Company to broaden the product base and add facilities which will increase the quality and customer services in each of its divisions. These include Alloy Metal Wire Company, Buffalo Steel Division, Connors Steel Division, Delta-Star Electric Division, Leschen Wire Rope Division, Quaker Rubber Corporation, The McLain Fire Brick Co. and the Watson-Stillman Company.

Electric Heating Unit Booklet Available

A 23-page booklet on electric heating units is available from the **Westinghouse Electric Corporation.**

★ ★ ★

Prepared in a convenient four-by nine-inch size, the new booklet presents complete data on heaters, thermostats and switches for the users of industrial electrical units.

★ ★ ★

In addition to complete tables listing wattage required, supply voltage and dimensions, drawings are shown which give details of construction and mounting instructions.

★ ★ ★

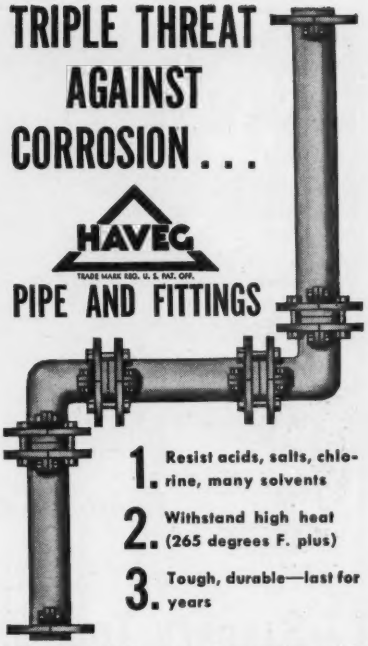
First sections of the handbook cover strip heaters, forced convention air heaters, room and oven heaters. The complete line of Corox heaters follows including immersion, bolt, finned and special shaped units. Cartridge heaters, and melting pots are included also. Latter sections of the booklet are

TRIPLE THREAT AGAINST CORROSION . . .

HAVEG

TRADE MARK REG. U. S. PAT. OFF.

PIPE AND FITTINGS



1. Resist acids, salts, chlorine, many solvents
2. Withstand high heat (265 degrees F. plus)
3. Tough, durable—last for years

Beat the high cost of corrosion with proven, genuine Haveg pipe and fittings. Pipe highly corrosive fluids in temperatures as high as 265 degrees F. with a good margin of safety! Since Haveg is not a coating or lining, the possibility of contamination is eliminated.

Haveg is a moldable, thermosetting plastic made by mixing acid-digested asbestos with special resins. Haveg process equipment is unusually resistant to most acids, salts, chlorine, many solvents . . . and withstands extremely high thermal shock. Haveg is really a triple threat against corrosion!

Send for 64-page Bulletin F-6. It contains complete information on Haveg pipe, fittings, valves, pumps, cylindrical and rectangular tanks, heat exchangers, and other corrosion-resistant process equipment. Call your Haveg sales engineer for first-hand facts.

PUMPS TANKS PIPE

HAVEG CORPORATION

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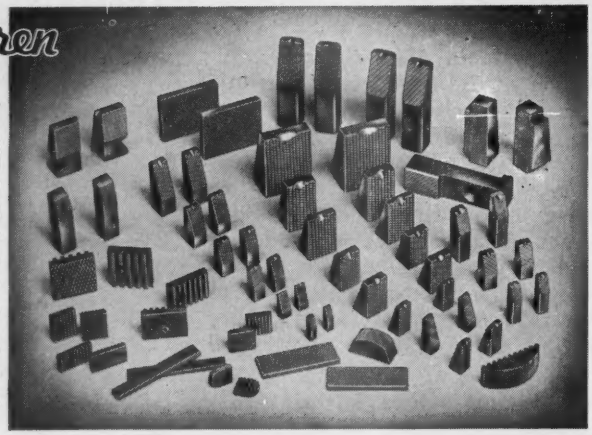
JAWS....

for Wedge Grips, Pullers and Tensile Testing Machines of all makes are available either from stock or manufactured to order. A Sjogren jaw, made to meet your requirements, guarantees you service.



SINCE S&S 1927

Used by Wire Men Who Want the Best!

SJOGREN TOOL AND MACHINE CO., INC.

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

14 SWORD STREET
AUBURN
MASSACHUSETTS

Coming Events of

THE WIRE ASSOCIATION

REGIONAL MEETING: June 11, 1954, Los Angeles, California. Registration, headquarters for plant inspection trips and luncheon at the new warehouse of Colorado Fuel and Iron Corporation. Cocktail hour, dinner, door prizes, after dinner speaker and sound motion picture at the Statler Hotel, Los Angeles.

ANNUAL CONVENTION: Statler Hotel, Detroit, Mich., November 8-11, 1954. Ferrous and non-ferrous technical sessions and two plant inspection trips. There will be many other features, including the Annual Luncheon, the Mordica Memorial Lecture, which will be commemorative to the Silver Anniversary of the Association, and the Annual Stag-Smoker Dinner and Show.

THE WIRE ASSOCIATION

453 MAIN STREET STAMFORD, CONN.

devoted to the selection of the correct heater for a specific application. Here, formulas and graphs are given and sample problems are solved.

★ ★ ★

For a copy of this booklet, B-6161, write Westinghouse Electric Corporation, P. O. Box 2099, Pittsburgh 30, Pa.

Philips to Exhibit at ASTM Show

Norelco equipment will be exhibited in booths 79 & 80 at the 11th ASTM Exhibit of Testing & Scientific Apparatus & Laboratory Supplies in the Hotel Sherman, Chicago, June 14-18, by the Research & Control Instruments Division, **North American Philips Company, Inc.,** 750 South Fulton Avenue, Mount Vernon, N. Y.

★ ★ ★

The company will show Norelco X-ray analysis equipment and accessories including the Diffractometer, the Spectrograph and various types of cameras. Also on display will be radiographic equipment including the MG 60, MG 160, 150 Rod Anode and Portaflux.

★ ★ ★

In addition, the booths will contain the EM-75 and EM-100 electron microscopes. A number of technical specialists will be in attendance to explain and demonstrate proper use of the various types of equipment.

Modern Sales Techniques Pioneered by Scovill

Modern selling practices are based on pioneering efforts of America's oldest brass firm according to incidents related in "The Old Country Store," a new book written by **Gerald Carson** and published by Oxford University Press.

★ ★ ★

In his highly documented book on merchandising methods from post-Revolutionary days, Mr. Carson relates events in the history of **Scovill Manufacturing Company** which helped transform "peddlers" and "drummers" into today's sales specialists.

★ ★ ★

Like other manufacturers Sco-

vill used itinerant peddlers to carry their products throughout the country. In 1828 Scovill sent two of their own men out to exclusively merchandise the brass firm's own line. Four years later the firm made a radical change in its sales approach.

* * *

Mr. Carson reports that Scovill Manufacturing Company made a pioneering experiment in sending out a button salesman, **Merit Welton,** through the Middle West in 1832. Not a peddler, Welton had the distinguishing characteristics of a modern commercial traveler; he did promotion work, carried no stock, sold from sample cards, took orders according to sample, accepted no barter goods, and the company made delivery later by freight. The results of this novel effort, as it happened, were disappointing.

* * *

The author compiled his material for this book from primary material, hundreds of old store accounts, manuscripts, almanacs, diaries, old newspapers and histories.

New Bulletin on Variable Pitch Sheaves and Special Drives

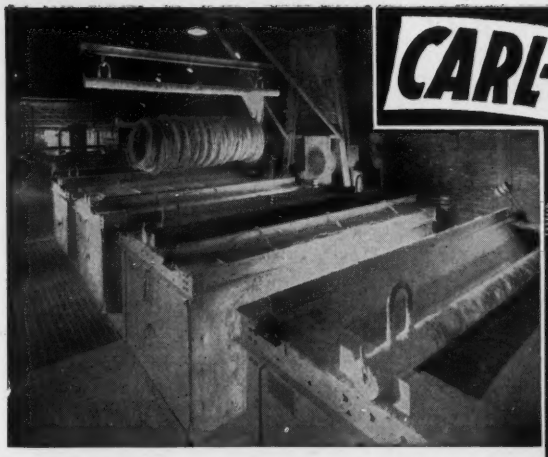
Just off the press is a new 8-page, illustrated bulletin describing the variable pitch sheaves and special drives manufactured by **Speed Selector, Inc.**

* * *

Illustrated are a number of typical applications of Speed Selector Sheaves on various types of machines and power driven equipment. Shown are installations on a punch press, radial saw, tap grinder, aircraft propeller governor test stand, "iron lung" respirator, test stand for calibrating aircraft instruments, etc.

* * *

Dimensional drawings and charts provide necessary engineering data on Speed Selector Sheaves which are available in seven standard sizes from 3" to 8" outside diameter. Capacities range from ¼ up to 15 H.P. Sectional drawings show interesting construction and



CARL-MAYER
HI-SPEED REGISTERED
ROD BAKERS

PATENT Nos.
U.S.A. 2,296,361 2,323,828
CANADA 2,235,559 396,144 401,589

ALSO OTHER TYPES OF INDUSTRIAL OVENS AND FURNACES

GREATER SPEED AND FUEL ECONOMY PROVES OUTSTANDING ENGINEERING

Carl-Mayer Hi-Speed Rod Bakers have an exclusive heating arrangement, combining faster baking with amazing fuel economy—and a patented Blow-Off feature which removes moisture without bumping or agitating the coils. *WRITE FOR BULLETIN NO. 350.*

SERVING CONCERNS LIKE THESE:

American Steel & Wire Co.
Atlantic Wire Co.
Atlas Steel Co.
Atlas Tack Corp.
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Canadian Steel Corporation.
California Wire Cloth Corp.
Colorado Fuel & Iron Corp.
Crucible Steel Co. of America
Eaton Manufacturing Co.
Frost Steel & Wire Co., Ltd.
B. Greening Wire Co., Ltd.
Gary Screw & Bolt Division of Pittsburgh Screw & Bolt Corp.
Hollup Corp.
Indiana Steel & Wire Co.
Johnson & Nephew, Ltd.
Jones & Laughlin Steel Corp.
Page Steel & Wire Co.
Pittsburgh Tool Steel Wire Co.
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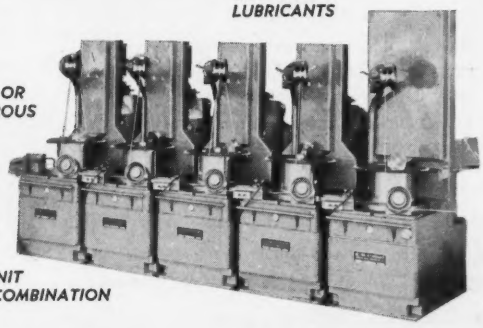
THE CARL-MAYER CORPORATION
3030 EUCLID AVENUE
CLEVELAND, OHIO

AETNA-STANDARD
WIRE DRAWING UNIT

WET OR DRY LUBRICANTS

FERROUS OR NON-FERROUS



SINGLE UNIT OR ANY COMBINATION

- DESIGNED FOR COMPLETE VERSATILITY
- BUILT FOR SAFE, EFFICIENT PRODUCTION
- SINGLE OR MULTI-DRAFT OPERATION
- INTERCHANGEABLE UNITS AND PARTS
- AUTO-RHEOSTATIC SYNCHRONIZATION
- WATER COOLED BLOCKS AND DIES

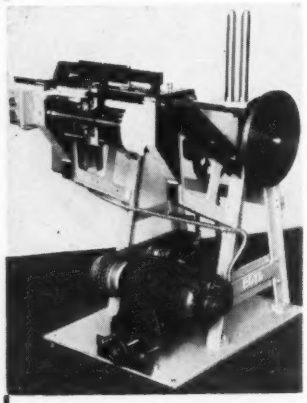
THE AETNA-STANDARD ENGINEERING CO.
PITTSBURGH, PA.

ASSOCIATED COMPANIES: HEAD, WRIGHTSON & COMPANY, LTD., THORNABY-ON-TEES, ENGLAND
AETNA-STANDARD ENGINEERING COMPANY, LTD. . . TORONTO, ONTARIO, CANADA

FOR HEAVY DUTY COILING

USE THE NEW BOYD #1200 HEAVY DUTY SPOOLER

Designed for the spooling or coiling of heavy materials on large diameter spools or in coils.



Positive screw reversing mechanism and change gears offer a wide range of distances and speeds for traverse rates to accommodate various sizes of wire or other materials.

Large adjustable slip clutch provides constant speed of winding to allow for build-up and to produce uniformity. This makes this machine an excellent addition to your drawing or finishing machine producing your product at a point where it is to be packaged.

Supplied with gear motor and starter, Hi-Lo pulley and motor base. Can also be had with predetermining counter and auto-stop motion.

Its versatility allows it to be easily suited to meet your particular requirements in spool or coil diameters and traverse widths.

Send for full particulars

BOYD & SONS MANUFACTURING CORPORATION

1434-38 Callowhill St. **Philadelphia 30, Pa.**

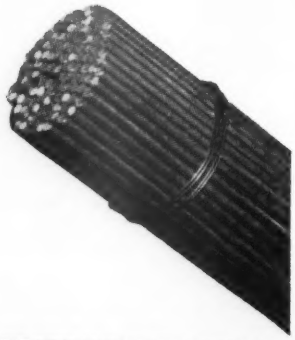
finish · temper · gauge · length

SHIPPED TO YOUR SPECIFICATIONS...

CALWICO

STRAIGHTENED AND CUT WIRE

Applicable to a wide variety of end uses, CALWICO Straightened and Cut Wire is your best buy. For complete information mail the coupon below.



The Colorado Fuel and Iron Corporation
Pacific Coast Division
1080 19th Avenue
Oakland 4, California

Please send data on CF&I Straightened and Cut Wire.

Name_____

Address_____

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Use_____ **General Specifications**_____

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THE COLORADO FUEL AND IRON CORPORATION • Denver, Colorado
PACIFIC COAST DIVISION • Oakland, California

CALWICO STRAIGHTENED & CUT WIRE
THE COLORADO FUEL AND IRON CORPORATION CF&I

operating features.

★ ★ ★

One full page is devoted to "Combination Sheave Size Selection Tables." Another helpful page is a chart on "Belt Length Center Distances."

★ ★ ★

Copies of this new bulletin, "Speed Selector Variable Pitch Sheaves" may be had by writing the manufacturer, Speed Selector, Inc., 118-V Noble Court, Cleveland 13, Ohio.

New Splicing System for Wire Rope

Huge savings in time are made possible by a new wire rope pressing system that eliminates hand splicing. Using the new system, a worker can make as many as 20 or 30 splices in an hour, as compared to 6 or 7 conventional splices per hour for a skilled worker using hand methods.

★ ★ ★

The new pressing system, announced by **Jones & Laughlin Steel Corporation,** employs an aluminum alloy clamp or sleeve that is squeezed around the wire rope in a special 300-ton hydraulic press. Called Ja1Klamp, the device is used as a mechanical method of splicing eyes, with or without thimbles, in the ends of wire rope. This "splice" gives 100% of the breaking strength of the wire rope itself and saves about 85% of the rope length needed to make splices by hand.

★ ★ ★

Jones & Laughlin is the exclusive distributor of the clamps and presses in the United States. The clamps are made in Sweden under patents held by Gerhard Rohland of Goteburg, Sweden. The dies and special hydraulic presses are also of Swedish origin.

Opens Industrial X-Ray Office in Houston

The Research & Control Instruments Division, **North American Philips Company, Inc.,** 750 South Fulton Avenue, Mount Vernon, N. Y. has announced the opening of a new regional office at 4517

Fannin Street, Houston, Texas.

★ ★ ★

Robert Seibert is manager of the new headquarters, which serves an area that includes Texas, Louisiana, Mississippi and Florida.

★ ★ ★

Equipment displayed and demonstrated in the Houston office includes the complete line of Norelco X-ray Diffraction and Spectrographic Instruments and Accessories; also Industrial Radiographic Units. Spare parts and service are also available.

New Belt Drive Announced

A completely new concept of power transmission, the Poly-V Drive, has just been introduced by the **Manhattan Rubber Division of Raybestos-Manhattan, Inc.**, Passaic, N. J.

★ ★ ★

The Poly-V Belt, which is a single, endless rubber belt with a series of parallel V ribs molded lengthwise around the inside circumference, has an uninterrupted, high-strength member of synthetic cords across its entire width.

★ ★ ★

The Poly-V sheave grooves are designed to mate precisely with the belt ribs, and since the belt covers the full width of the drive member (not an assembly of several V-belts), the load is distributed equally over the entire driving surface. This provides twice the contact area of a comparable multiple V-belt application, so that it gives up to 50% greater horsepower with the same width or equal horsepower with 1/3 less sheave width.

★ ★ ★

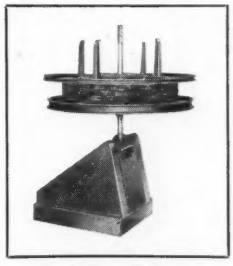
Design features reduce face pressure one half, giving longer life to belt and sheaves. Also, the full drive width and the total traction surface contact prevents belt turnover and progressive sinking in sheave grooves.

★ ★ ★

One of the most important features of the new drive is that it eliminates belt matching problems

MOSLO "SHIFTWEIGHT"
COUNTER-BALANCED WIRE REELS

Take the Manual Labor out of loading a Reel with Wire. Just unlock the knurled spindle by a twist of the wrist, tilt the reel assembly 90°, roll coil of wire to reel, lift 6" on to centering arms, release lock by twist of wrist, use spindle as lever to lift, and the *Weighted Counterbalance does the rest!*



Immediate Delivery
$190.00 F.O.B. Cleveland

Capacity 300 lbs.—Min. Coil I.D. 10"—Max. O.D.—41".
All welded steel construction—Brake Equipped.

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2443 PROSPECT AVE. • CLEVELAND 15, OHIO
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First Quality
DIAMOND POWDER

WE BELIEVE THAT • • •

- The finest, properly graded Diamond Powders are more economical to use than paste compounds.
- For very little more in price, you can get considerably greater value for your money—in DANFORTH powders.
- Purity of diamond powders is essential to properly finished wire drawing dies. Beware of bargain prices!
- DANFORTH grading is accurate—you get what you order.

COMPLETE RECLAIMING SERVICE

The DANFORTH PROCESS of reclaiming produces powders that are guaranteed to be 99% or better pure. Some reclaiming work runs much lower—but never DANFORTH'S.

Our process reclaims more powder than any other method, always of a purity higher than Government specifications.
Write today for information on new and reclaimed powders.

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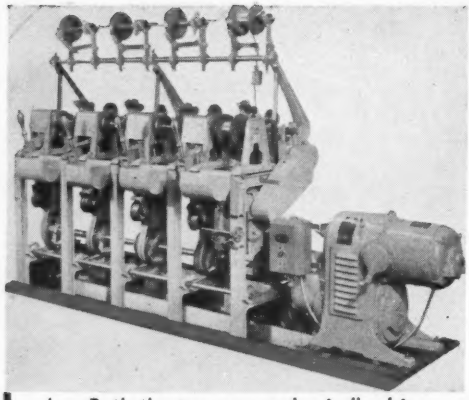


1900-HV MULTIPLE SPINDLE SPOOLER

SPECIFICATIONS
Size Range: .010" to .080" or heavier if soft and many flat wire sizes.
Max. Spool Size: 16" flange diameter.
Capacity: usually 4 to 8 spindles.

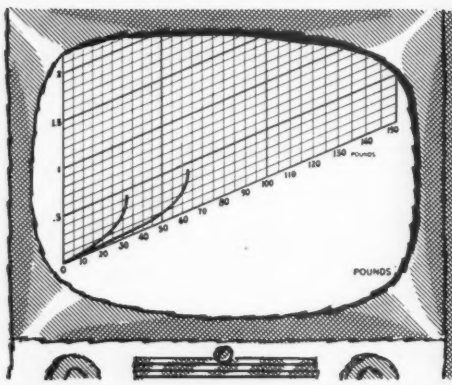
The 1900-HV Spooler is a rigid, precision machine which will consistently produce a uniform, dense wire lay. Both the traverse and spindle drives are regulated through wide-range, stepless, variable speed units, eliminating change gears. The 1900-HV is completely adaptable to your particular constant or changing demands. All controls are positive. Adjustments are made accurately with the spooler in operation and without tools.

Both smooth acceleration and rapid stopping is obtained through a single lever at each station. Spool changing is simple and rapid. Anti-friction bearings are used on all shafting and spindles.

Your special requirements can be incorporated into the design. Each machine is delivered ready for operation from your power supply. Payoff stands furnished as extras.

Consult us on your spooling problems.

ROBERT J. EMORY COMPANY
31 East Runyon Street Newark 5, N. J.



It makes the picture clear

SCOTT TESTERS* "picturize" your wire in terms of easily understood reproducible values:

TENSILE values obtained directly from machine records.
ELONGATION picturized on filing size charts
LAB or production testing—accurate determinations on both laboratory and piece-rate scales.

ARE YOU FAMILIAR WITH OUR LATEST DEVELOPMENTS?

SCOTT TESTERS, INC.
55 Blackstone St.
Providence, R. I.
*REGISTERED TRADEMARK

Scott Testers — Standard of the World

common to multiple V-belt applications and it affords a marked economy in belt and sheave inventories.

★ ★ ★

Belts and sheaves in a range of sizes are now in production. The general price range is the same as V-belt transmission drives for comparable service.

Elgin Abrasives Division to Market Carbide Tools

Elgin National Watch Company, Elgin, Ill., is entering the fast-growing tungsten carbide field with a complete line of high-precision rotary cutting and grinding tools for marketing to the metal-working trades through its abrasives division.

★ ★ ★

C. R. Myer, manager of the division, described the tools as a logical supplement to the present line of diamond abrasive compound, which he said "takes over where tools leave off" in finishing close-tolerance tools, dies and other mechanical parts.

★ ★ ★

To be marketed under the "Golden Circle" trade mark, the tools will include a complete range of shapes, sizes and cutting actions for all types of material, finishes and processing methods. All are made to Elgin precision specifications.

★ ★ ★

Burrs and files are available in seven shapes—plain cylindrical, ball nose, ball, egg shape, tree shape with radius end, tree shape with pointed end, and cone. Three unique features of these tools are their availability in either tungsten carbide or high-speed steel; hand-ground, machine-ground or file cut, and in center-fluted or segment-fluted design.

★ ★ ★

An important part of the new line is an assortment of miniature carbide cutters for extremely close-tolerance work. Also included are solid carbide end mills, carbide grinding burrs and standard chatterless countersinks.

The Worcester Regional Meeting of the Wire Association

(*Continued from page* 648)

troduced, included **Leslie C. Whitney,** Vice President, Ferrous Section of the Association, **Ralph B. Roth,** Vice President, Non-Ferrous Section, **Stephen B. Metcalf,** Assistant District Manager of American Steel & Wire in Worcester, who extended an invitation to those present to visit their Cable Works, **Richard E. Brown,** Executive Secretary, and **Mrs. Ruth S. Spengel,** Assistant Executive Secretary.

★ ★ ★

The guest speaker of the evening was **W. K. Ousley,** Vice President of the Boston Manufacturers Mutual Fire Insurance Company, whose talk was entitled "How to Make Plants Burn." In this semi-humorous lecture Mr. Ousley, by inverse inference, pointed out the more common sources of danger in wire mills and the proper steps to take, or not to take, to prevent or to cause fires. He presented a series of charts embodying fire insurance company recommendations to avoid the disaster of fire. These charts were headed:

"Use Safe Construction"
"Install Sprinklers for All Combustibles"
"Provide Enough Water"
"Train Your Employees"
"Provide Support of Top Management"

★ ★ ★

With a final admonition that the way to have bigger and better fires is to make an effort to avoid such precautions, he closed his talk and this most enjoyable evening session was brought to a pleasant end.

★ ★ ★

Some twenty five persons who had not purchased tickets in advance, were turned away because the hotel was unable to make last-minute adjustments in its arrangements.

The Plant Inspection Trips

Busses left the hotel for the wire and rope plants of the Wickwire Spencer Steel Division of **Colorado Fuel & Iron Corporation** in Palmer at 8:30 A.M. on Friday, April 23rd.

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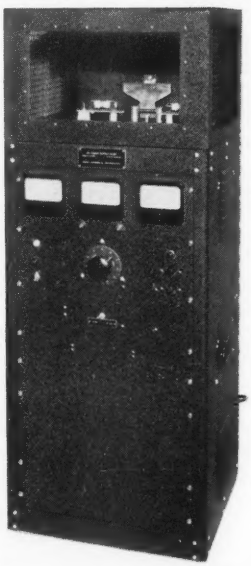

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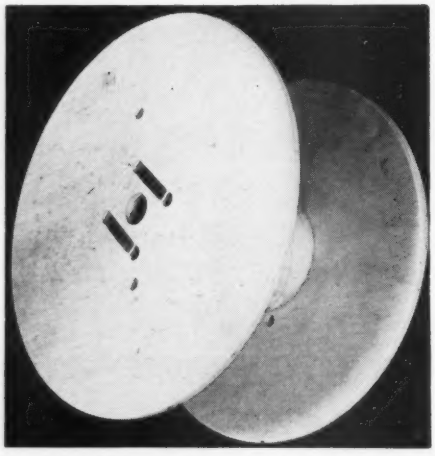

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This tour had no guides, but well-marked routes for the visitors to follow, with a foreman or engineer stationed at each point of interest to answer questions.

★ ★ ★

In the wire mill the following departments were visited: laboratory, patenting room, cleaning, high carbon wire drawing, testing, packing and shipping, low carbon rod machines, annealing, low carbon intermediate wire drawing and the galvanizing and plating rooms.

★ ★ ★

In the wire rope department, fine wire stranding machines were observed, the mill maintenance machine shop visited and other departments seen, such as the laboratory, wire rope storage, heavy stranding and spooling, wire rope shipping and the intermediate strander room.

★ ★ ★

Luncheon was served in Palmer at the Grange Hall through the courtesy of Wickwire Spencer. Approximately 150 persons took this trip.

★ ★ ★

Busses left the hotel at 9:00 A.M. for the Electrical Cable Works of the **American Steel and Wire Division of United States Steel Corporation** on the south side of Worcester.

★ ★ ★

Visitors were met at the works by a staff of engineers, who divided them into small groups and guided them about the huge plant, where various cable making operations were seen, from the drawing of copper and aluminum wire from purchased rods down to fine sizes. Various operations shown to their guests were annealing, stranding, paper and metal tape serving, braiding, knitting, rubber extrusion, rubber processing, lead covering, testing, packing and the many other numerous operations that go with the manufacture of a wide variety of electric wire and cable, from simple types to heavy complex types for the carrying of

high voltage currents.

* * *

One of the interesting points of interest was the Quality Control Room, presided over by Mr. Sternlof, who had delivered a paper the day before on this subject. Here he showed the full charts, portions of which he had exhibited in connection with his lecture, explaining to the guests just how production faults had been detected and corrected.

* * *

After the plant tour, visitors, about 120 of them, were driven to the Parish House of the Quinsigamond Baptist Church, where they were refreshed by an excellent luncheon, provided by the ladies of the Church through the courtesy and as the guests of American Steel and Wire.

The Ladies

A special program for the ladies had been arranged for Friday morning, with approximately twenty of them being transported to Sturbridge to go through the reconstructed Old Sturbridge Village there. This trip was directed by the gracious and lovely Mrs. Roger M. Scott, who served as hostess on behalf of the Program Committee for this tour. Luncheon for the group was served in the village. It is reported that all most thoroughly enjoyed seeing this fine bit of Americana.

* * *

The ladies, of course, were also present at Morgan's Hospitality Hour and at the banquet.

Conclusion

The Program Committee is to be congratulated for an exceptionally fine meeting. They worked hard and long to provide a top-notch program and the results completely justified their efforts. The quality and variety of technical papers was of high order.

* * *

This meeting was the largest and most successful from every standpoint that has ever been held in a regional district and set a pattern for next year's Program

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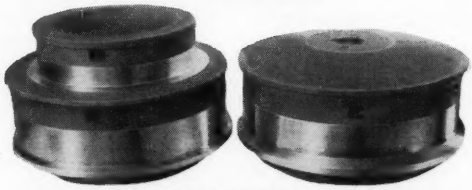

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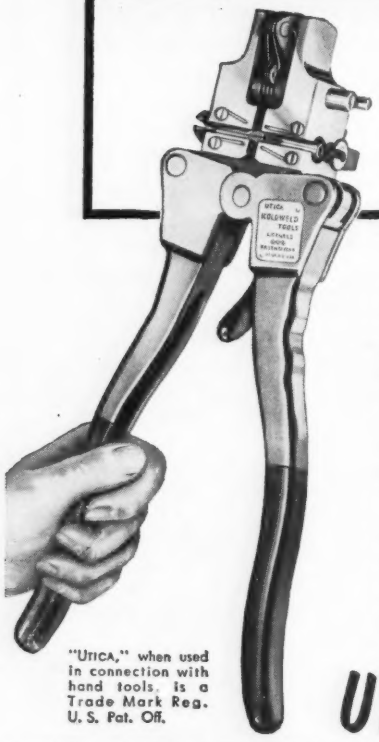

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Committee to try to emulate. The grateful thanks to the Program Committee, expressed officially by the Board of Directors in its meeting, is echoed by all who attended.

★ ★ ★

New Carbide Tools Announced by Carboloy

The addition of standard tools and blanks in new cemented carbide grades 350 and 370 has been announced by **Carboloy Department of General Electric Company,** Detroit 32, Mich.

★ ★ ★

Grade 350, announced April 26th at the ASTE Convention in Philadelphia, was developed for light roughing and general finishing of steel. Grade 370, announced last fall, is for heavy-duty steel cutting applications.

★ ★ ★

Blanks of grade 350 carbide are available in numerous sizes and three styles of rectangular blanks. All standard square, triangular, and round mechanically held inserts, finish ground ready for use, also are available in this grade.

★ ★ ★

Grade 370 carbide insert blanks are stocked in a similar range of selected blank designs and sizes. A wide selection of both right and left-hand standard tools is available in both grades.

★ ★ ★

The new material, with its unique grain structure, extends the machining range of the new series to another area—to withstand cutting temperatures as high as 1800°F. To the user, the new carbide means a cutting material that includes a combination of superior wear resistance and extreme toughness previously unavailable for this range of machining.

★ ★ ★

Like the previous 300 series grade 370, the new grade 350 is made from start to finish with a new carefully controlled manufacturing process which gives it built-in structural rigidity. Manufacturing technique is the result of continued development work to control the consistency of materials to close limits.

"Hypalon" Chlorosulfonated Polyethylene— A New Material for the Wire and Cable Industry

(*Continued from page* 638)

applications where the colorability of "Hypalon," along with its other desirable properties suggest its use. Brightly colored compounds have been developed which weather age exceptionally well.

★ ★ ★

Used in blends with ozone-sensitive elastomers such as natural rubber and GR-S, "Hypalon" raises the level of ozone resistance sufficiently to withstand attack by atmospheric ozone. For many uses outside the wire and cable industry, the use of "Hypalon" in such blends is already well underway. It is expected that it will find similar uses in wire and cable both as jacket and insulation.

Conclusion

"Hypalon," a new elastomeric material, can be processed with conventional rubber machinery and cured into many products which have complete ozone resistance, excellent resistance to abrasion, heat, sunlight and weather, low water absorption and a wide color range. A few of the applications as a wire covering have been listed. Good progress is being made in adapting "Hypalon" for use in wire and cable.

Aluminum Industry Representatives Attend Extrusion Conference

Firth Sterling Inc., Pittsburgh, Pa., was host to aluminum industry representatives at a forum on tool engineering problems, relating to aluminum die extrusion, which dealt with tool steel, carbide and cermet applications.

★ ★ ★

Objectives of the one-day forum were to determine conditions of use and specifications of desirable die materials for aluminum extrusion. The group attending the forum analyzed the problems encountered in the aluminum extrusion industry with the objective that Firth Sterling would initiate a research program to develop new alloys to meet aluminum extrusion die problems.

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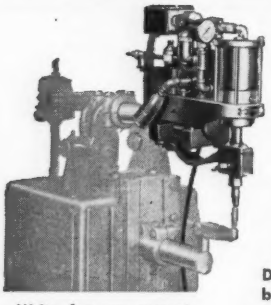

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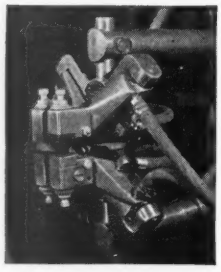

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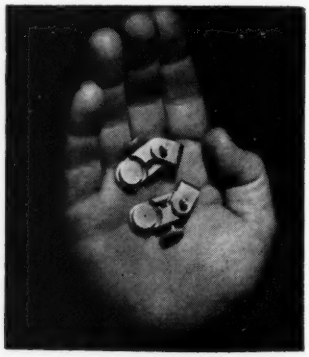
New Wire Grips Secure Fine Filaments for Tensile Tests

The difficult task of obtaining accurate tensile readings on fine filaments has been greatly aided by the tiny, specially designed Dillon gripping fixtures shown in the accompanying picture.

★ ★ ★

As a rule, the strength of such delicate materials as fine gauge wire, thread, etc. is considerably impaired by the necessity of clamping them firmly enough to exert



Fine Wire Grips

the desired test load. However, with these new fixtures, full tensile stress is not brought to bear on the filaments at the clamping points, but only after they have been passed two or more times around self-aligning drums, thus assuring perfect tests. These polished fixtures are machined from hardened aluminum, and the drums operate on free-swinging pivots so that a true vertical pull is exerted. Measurements of each fixture are only 1-9/16" long by 5/8" wide by 17/32" thick. Drum diameter is 1/2". Net weight but 1/2 ounce—a pair of them being so small as to be contained easily in the palm of a man's hand.

★ ★ ★

The testing machine used with the grips is a Dillon Multi-Low-Range Tester capable of applying loads of from 0 to 300 lbs. Large 8" dial is calibrated in four individual ranges, graduated in ounces for close readings.

★ ★ ★

In addition to tensile, the Dillon Multi-Low-Range Tester will per-

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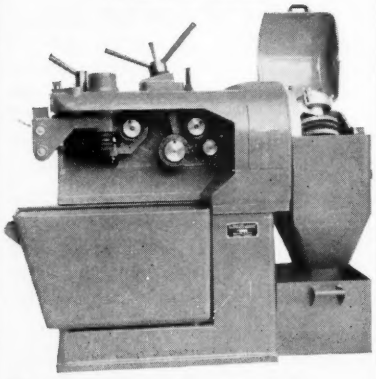

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Standard Machinery Adds Engineer to Staff

B. H. Davis, Vice President of **The Standard Machinery Company,** Mystic, Conn., is pleased to announce that on June 1st Alden Nelson, formerly chief engineer of **The James L. Entwistle Company,** Pawtucket, R. I., joined the engineering staff of Standard. Mr. Nelson is working directly under Davis and has charge of the development of superior equipment for the wire and cable industry.

★ ★ ★

Mr. Nelson, who is well known to the industry, has been in charge of design for Entwistle for over ten years and before this was associated with Brown & Sharpe, as a designer of automatic screw and milling machines. His background will be of tremendous help in Standard's policy of supplying new and advanced machinery to the wire and cable builders of the world.

Belden Develops New TV Lead-in

Picture-distorting electrical line losses are reduced to improve UHF and VHF television reception by insulating a completely new lead-in wire with Bakelite cellular and solid polyethylene. Wrapped in the durable solid jacket around a cellular core, twin pair lead-in wires conduct the ultra high-frequency signals from aerial to receiver with a maximum of electrical efficiency and stability. This new 300-ohm

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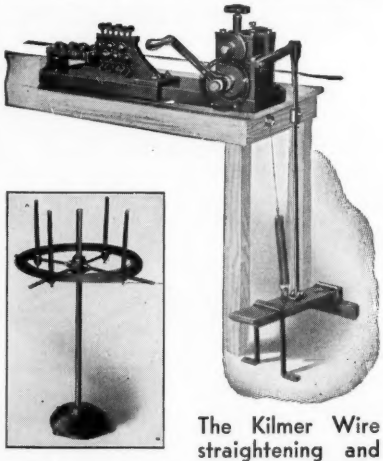

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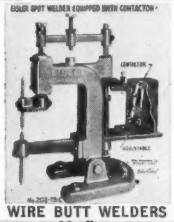

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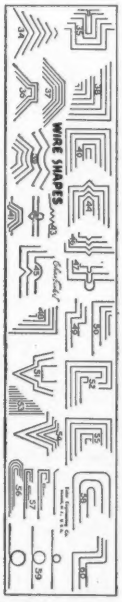
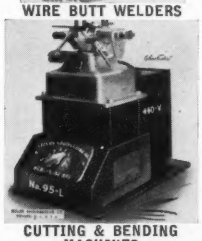


WIRE BUTT WELDERS



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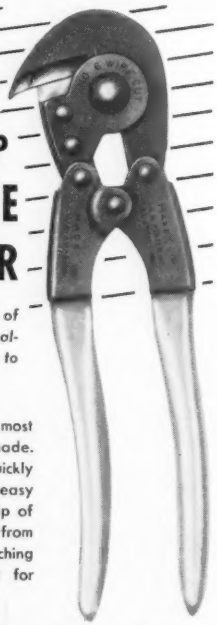

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line was developed by **Belden Manufacturing Company**, Chicago, Ill., as a lead-in for UHF and VHF. The polyethylene core between the two wires is filled with tiny unconnected cells containing an inert gas.

★ ★ ★

This cellular polyethylene, recently developed by **Bakelite Company**, a Division of Union Carbide and Carbon Corporation, has a specific gravity and dielectric constant less than that of solid polyethylene from which the outer jacket is made. The thick outer wall protects the cable against abrasion, water, weather and mechanical damage. The new cable's insulation is specifically designed to meet the problems of high-frequency transmission. The bulge of insulation between wires instead of the flat tape of conventional television lead-ins reduces the effect of moisture, soot and dust on the surface of the wire. The parallel conductors are annealed copper-covered steel strands with 49 per cent greater resistance to breaking from flexing or stretching than all-copper conductors, according to the manufacturer. Because Bakelite polyethylene resists moisture absorption, it is not necessary to seal the new cable off at the ends. This cable can also be clamped tightly in standoff insulators without crushing.

Booklet on How to Obtain the Right Washer for Your Job

Sixteen pages of helpful information and pictures on the manufacture and availability of metal and fiber washers, both standard and special. Contains useful data on general washer characteristics, tolerances, and facilities for meeting individual requirements. Lists standard washers carried in stock and gives existing die sizes for the production of more than 30,000 types and sizes of washers. Mailed on request to **H. K. Metal Craft Manufacturing Company**, 3775 Tenth Avenue, New York 34, N. Y.

New Plant Opened by Hooker

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- DIAMOND POWDER RECLAMATION — Exclusive process that gives maximum recovery. Send us your old cotton, die washings, worn wheels and sludge. High salvage percentages will pay you well.
- DIAMOND POWDERS—Complete line of graded quality powders for all lapping and finishing operations on wire drawing dies. First grades only.
- DIAMOND GRINDING WHEELS—A complete line of top-quality wheels for industrial production.

Write for prices.

NATIONAL RESEARCH COMPANY

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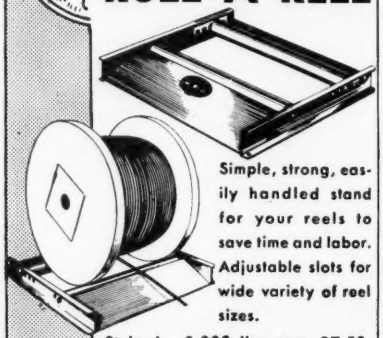
Time to Discard **OLD-FASHIONED WAYS**

Jacks . . props . . shores . . horses . . why fool with these obsolete methods of handling reels? DO IT THE MODERN, EFFICIENT WAY! Reel or unreel wire, cable, rope with

ROLL-A-REEL



Simple, strong, easily handled stand for your reels to save time and labor. Adjustable slots for wide variety of reel sizes.

Style A: 2,000 lbs. cap. 37.50
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LIME
for
WIRE DRAWING

WARNER COMPANY
BELLEFONTE DIVISION
BELLEFONTE, PA.
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Attention—Springmakers!
New!
W-10 FINAL GUIDES IN SOLID CARBIDE
AT
New low prices!

Carbide tools give you longer life (at least 20 times the life of high-speed steel), less down time, greater spring accuracy and less operational cost.

SMS
SPRING MAKING MACHINES AND SUPPLIES
Write for catalog
THE SPRING MFRS. SUPPLY CO.
95 MARION AVENUE
PLANTSVILLE, CONN.

its new $12,000,000 caustic soda—chlorine plant at Montague, Michigan, on March 17th, **R. Lindley Murray,** president, announced recently.

★ ★ ★

This plant, designed to be one of the most modern and up-to-date plants of its type in the world, is located on White Lake adjoining Lake Michigan and less than 200 miles from Chicago. It provides a midwest manufacturing center for Hooker, which also has large plants at Niagara Falls and Tacoma, Washington. It is situated closer to the Chicago and midwest markets than any other caustic soda—chlorine plant and thus affords freight savings to consumers in that area.

★ ★ ★

The plant will supply 50% and 73% liquid caustic soda and liquid chlorine in tank cars to many industries. Caustic soda also will be shipped in bulk by barge direct to customers as well as to the company's storage facilities on the Illinois Waterway at Lake River Terminal near Chicago for local distribution.

New Bobbin Winder Designed for Wire Weaving Looms

A new single unit bobbin winder designed for use with their wire weaving looms has been perfected and is now offered by the **Mummert-Dixon Company,** Hanover, Pa.

★ ★ ★

The winder is used in conjunction with fly screen wire weaving looms. It is recommended that each loom be provided with one of these bobbin winders. They are so designed that bobbins may be wound while the loom is operating, the speed of the winder being just a little faster than the loom's consumption of wire.

★ ★ ★

The winder is suitable for various sizes of bobbins and will handle 3 or 4 inch diameter bobbins in widths of ½ to 1¼ inches. Its traverse and wire guide can be adjusted to any widths of movement and it will wind in such manner that the wire will not pack

YARNS

For electric wire. Acetate, nylon and silk, natural or dyed. Put up on braider tubes, spools or cops.

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NON-RETURNABLE
METAL
SPOOLS

STANDARD 5", 6½" x 10½" DIA. SPOOLS TO MEET ALL RIGID NON-RETURNABLE REQUIREMENTS

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Buy the Best: MONTGOMERY SILVER-COATED COPPER WIRE

Round for Kel-F & Teflon Insulated Radio and Instrument Hook-up Wire and UHF Cables.
Flat for Tinsel Ribbons and Tinsel Garlands.
— also —
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— also —
NEVA-TARN—Metallic Yarns—Tarnish proof— for knitted and woven fabrics. Est. '871

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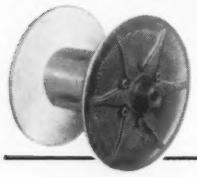
MILTON MACHINE

Save on replacement and maintenance!

RUGGED STEEL HEAVY DUTY PROCESSING REELS

RUGGED in design... DEPENDABLE in service!



Having trouble with light weight reels failing in heavy duty service? Send us a sketch or print stating the limiting dimensions and service required, we'll be glad to tell you about our facilities for supplying the wire rope and cable industry with special heavy duty processing reels, spools or bobbins. WRITE FOR BULLETIN 52-W.

MILTON MACHINE WORKS, Inc.
DESIGNERS — ENGINEERS — MANUFACTURERS
MILTON • PENNA.

THE BETTER YOUR WIRE . . .
THE BETTER YOUR PRODUCT!

Choose *Cortland* GALVANIZED WIRE

Fine products are made from fine-quality materials. That's why so many fabricators and formers select Cortland Brand specialized low carbon wires. Cortland Brand wires are among the finest available . . . made from the best corrosion-resisting, open-hearth steel in Wickwire's own mills. Use them for your products . . . in any of the following types, sizes and finishes.

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SIZE: coils, spools or straightened cut to length.
FINISH: plain, galvanized, coppered or tinned.
TYPE: stone wire, bookbinder, flat, etc.

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We Pay Highest Prices for Used Machinery

WE OFFER 235 WARDWELL BRAIDERS

All Machines Reconditioned in Our Own Shop

WIRE & TEXTILE MACHINERY INC.
P. O. BOX 436, PAWTUCKET, R. I.

and bulge the flanges or cause the wire to tangle in paying out. The spindle and tailstock are mounted on ball-bearings. An individual motor furnishes power.

★ ★ ★

Operating at a speed of 580 RPM, a 3 inch diameter by 1 inch wide bobbin may be wound in 8¼ minutes.

A circular describing the new bobbin winder may be had by writing the Mummert-Dixon Company.

Modern Wiring System for New Building

The owners, architects, builders, and electrical contractors who recently completed a fluorescent lighting installation in a new industrial building at New Orleans, Louisiana have a wiring system which is, according to the official who supervised the installation, "modern, flexible, and rugged," and which answers the basic requirements of maximum lighting efficiency and trouble-free operation.

★ ★ ★

The building, a one-floor plant 440 x 200 feet, was constructed for the Edwin H. Fitler Company of New Orleans, and has a lighting system served by nearly two miles of Surfaceduct metal surface raceway supplied by **National Electric Products Corp.**, Gateway Center, Pittsburgh, Pa. The Fitler Company manufactures twine and rope in sizes up to the largest in normal commercial and industrial use.

★ ★ ★

Many lighting engineers point out that most of the existing lighting under which industrial workers do their jobs is far below already recognized and practical illumination standards. Much of the blame for these conditions, they say can be laid to inadequate wiring. If a wiring system is not designed to provide full rated voltage at ballast lead connections for fluorescent lamps, lighting efficiency suffers. Only when full voltage is applied can a building owner get the amount of light he pays for in energy consumed by the lighting system.

★ ★ ★

Surfaceduct, a development of National Electric Products Corporation, is a raceway through which all types of service may be obtained ranging up to 60 amperes. Designed specifically for commercial and industrial use, Surfaceduct requires only a few simple fittings for most installations. At the Fitler building, the duct's base is suspended from the roof by means of steel straps fastened to fitted hangars. Conductors are laid in the base and wire-retaining bridges are snapped in. Capping is snapped over the base and is locked in place by the retaining bridges.

★ ★ ★

Fluorescent fixtures are attached directly to the Surfaceduct base, and taps from ballast leads are connected to conductors carried in the duct. No capping is used on the duct where the fixtures are attached. A steel strap is placed over the base of the duct and bolts from the trough of the fixture fastens the fixture to the Surfaceduct through the strap.

New Book on Insulated Wires and Cables

A 140-page, illustrated book containing engineering references and descriptions of insulated wire and cables made for the electric utility industry has been prepared by the electrical wire and cable department of **United States Rubber Co.**

★ ★ ★

The new book contains chapters on the company's insulation compounds, jacket compounds, service cables, street-lighting cables, power cables, control cables, power and lighting wires and cables, bare and weatherproof wires and cables, portable cords and cables and insulated aluminum conductors. Complete descriptions, including engineering data, are given on each product.

★ ★ ★

A copy of the book can be obtained, without charge, by writing to the electrical wire and cable department, United States Rubber Co., 1230 Avenue of the Americas, New York 20, N. Y.

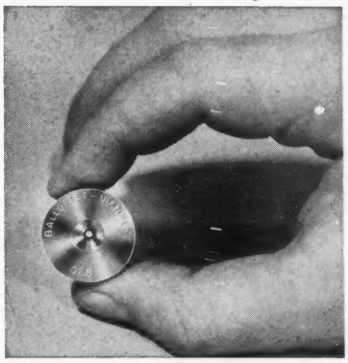
Article on Hydrogen in Steel

Murex Ltd., Rainham, Essex, England, in issue No. 13, 1954, of the Murex Review, has devoted the issue primarily to "The Significance of Hydrogen in Steel Manufacture." This very thorough treatise by K. C. Barraclough of the **Brown-Firth Research Laboratories** will be found of great interest to those metallurgists who are concerned with the study of the difficulties arising from the presence of hydrogen in steel, particularly as the author indicates means of preventing excessive amounts of hydrogen from entering the steel.

New Treatment Increases Heat and Chemical Resistance Properties of Plastics

Irradiated polyethylene, representing a notable advance in heat and chemical resistance over normal polyethylene, is now being offered experimentally in narrow film form by the General Electric Company's Chemical Division at Pitts-

BALLOFFET VIANNEY WIRE DIE CO., Inc.



All sizes from .081" down to .0004" in stock from New York.

Manufacturers of Quality diamond dies since 1870

BALLOFFET VIANNEY WIRE DIE CO., Inc.
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Tel: Union 3-3393

30,000,000 FEET OF WIRE FROM "BRIDGEPORT" CARBIDE NOZZLES!

These are made for use in extruding machines in covering electric wire with rubber or plastics.

Carbide nozzles are giving 300 times the production secured from those made of tool steels.

Precision-made carbide tools, any type, made to your order.

WIRE TOOL DIV., BRIDGEPORT JIG BORING COMPANY
303 STRATFORD AVE. • BRIDGEPORT, CONN.

TUNGSTEN CARBIDE WIRE DRAWING DIES

DESIGNED FOR LONG LIFE AND MAXIMUM WIRE PRODUCTION

Furnished semi-finished to within .001" to .002" of finished size at rough-drilled die prices. Require only light sizing and polishing before using. Our dies embody special design features that make for superior performance.

Also, a full line of carbide tooling for the Cold Heading Industry

EASTERN CARBIDE CORPORATION
NEW ROCHELLE, N. Y.

The TOP
DIAMOND DIES
are made by
PHILIPS

For your most exacting wire drawing requirements, standardize on NORELCO Diamond Dies, made by the master craftsmen of PHILIPS in the world's largest, most modern diamond die factory.

Only the very best South African and Brazilian diamonds are used. Each consists of one closed crystal. Less than .4% of all the diamonds mined meet PHILIPS high quality requirements for purity, structure and shape.

These diamonds are drilled to precision tolerances, varying in proportion to the diameter, normally 0.3 to 3.5 microns. Closer tolerances can be supplied, if required.

Let us quote on your diamond die requirements.

North American Philips Company, Inc.
Elmet Division, Lewiston, Maine

Norelco

Note below the highly polished precision shaped drawing channel of this die for drawing copper which gives a burnished finish to the wire and long life to the die.

field, Mass.

★ ★ ★

Designated "Irrathene" by General Electric, the new material's superior properties result from the bombardment of polyethylene with high-energy cathode rays from million-volt electron generators, according to Division General Manager **Robert L. Gibson.**

★ ★ ★

Cross-linking or vulcanization of the polymer during irradiation contributes form stability at 300-350 F and resistance to cracking when irradiated polyethylene is stressed and in contact with solvents or other active chemicals. In the form of insulating tape, G-E irradiated polyethylene is expected to be a factor in the development of smaller electrical equipment with improved operating characteristics.

★ ★ ★

A discovery by the General Electric Company's Research Laboratory, G-E irradiated polyethylene film has been subjected to intensive product and process development recently by General Electric's Chemical Division. The new plastics will be available in limited pilot-plant quantities this year, but large-volume production at low cost is envisaged for the near future.

★ ★ ★

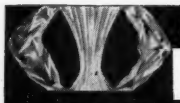
Believed to be one of the first industrial uses of electron irradiation, this new polyethylene is expected to expand the industrial and consumer use of polyethylene.

New Universal Grinding Machine Announced

Norton Company of Worcester, Mass., announces a new universal grinding machine, the 12″ Type U-4. The new machine has been designed to provide extra versatility through simplified set-ups and fast, precise grinding action for limited production items.

★ ★ ★

The principle new feature is the swiveling headstock which has a dog drive plate on one end for conventional grinding and a 5″ D-1



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FINE SIZE DIES
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DIAMOND DIES .0006 - .120 DIAMOND POWDER
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DIAMOND DIES, DIAMOND POWDERS
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For many years . . .
Outstanding in quality,
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for all WIRE DRAWING purposes.
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Diamond Dies for
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DIAMOND WIRE DRAWING DIES
in .000 sizes
EXPERT RECLAIMING SERVICE
MOLINA
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CREPED PAPER
COIL OR BAR WRAPS
NATIONAL WATERPROOF PAPERS, INC.
CAMDEN 1, N. J.

To prolong the wear and life of ROPE it pays to specify
MADESCO BLOCKS
MADESCO TACKLE BLOCK CO., EASTON, PA.

cam lock nose on the other end for mounting chucks or fixtures. To change from a dog-drive set-up to a chucking operation, it is only necessary to rotate the headstock 180 degrees and set up the work. When work is being ground on dead centers, the chuck does not rotate because the headstock is a combination live and dead center type.

★ ★ ★

A work speed range of 40 to 400 r.p.m. in an infinite number of increments is available at the turn of a dial. No direct current source is required as the headstock drive is A.C., controlled through rectifiers.

★ ★ ★

Quick changes from and to internal grinding is made possible by the hinged bracket internal grinding spindle which is readily lowered into position for use. It is not necessary to swivel the wheel assembly for internal grinding. This means greater speed and convenience in performing both internal and external grinding on the same piece since the set-up need not be disturbed.

★ ★ ★

A 1¼" diameter hole running clear through the headstock spindle provides additional capacity for long shafts. The grinding wheel head itself has two swivel mountings, one for the wheel head itself to regulate the angle of the wheel with relation to the work, and the other swivel below the wheel feed mechanism to regulate the angle at which the wheel is fed into the work, both graduated from 0 to 90 degrees each side of the zero position.

★ ★ ★

Other features include a combination lever and hand wheel operated footstock and a convenient grouping of electrical controls in an elevated enclosure. Pumps and motors are mounted in accessible locations; table ways are pressure lubricated from an outside reservoir, and the coolant tank has a ramped outlet to assist tank clean-out. A power wheel head rapid traversing positioning mechanism is also available for this machine.

SLEEPER & HARTLEY, Inc.
Designers and Builders
SPRING COILERS
WIRE WORKING MACHINERY
WIRE MILL EQUIPMENT
SPECIAL MACHINERY
Address Inquiries to
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WOOD REELS and SPOOLS
American Woodworking Company
1" to 60" Diameters. Send for our free catalogue of all wood products made in the U. S. A.
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Send data on Engineering & Construction facilities for
ACID-ALKALI-PROOF CONSTRUCTION
of pickling and other tanks; flooring.
(TEAR OUT & MAIL WITH LETTERHEAD)

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MACHINERY FOR HIGH SPEED PRODUCTION
BRAIDERS TAKE-UPS STRANDERS
CABLERS BUNCHERS TAPING MACHINES
NEW ENGLAND BUTT COMPANY
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WOOD & PLYWOOD REELS
for WIRE ROPE and
INSULATED WIRE & CABLE
THE NELSON COMPANY
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WORLD'S LARGEST MANUFACTURER
SPIRAL WRAPPING MACHINES
For Coils or Straight Lengths
Terkelsen Machine Company
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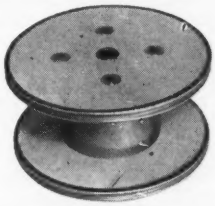
Made with "PRESSURE PAD" Fasteners
HOWSAM SPOOL COMPANY
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THE PARKIN CHEMICAL CO.
HIGHLAND BLDG. PITTSBURGH 6, PA.

WIRE DRAWING MACHINERY AND EQUIPMENT
Rod Frames — 16" Frames, 8" Frames — Take-Up Frame, Wire — Pointers — Puller Tongs — General and heat resisting alloy castings for wire mill use.
Circulars on Request
E. J. SCUDDER FOUNDRY & MACHINE CO.
TRENTON, N. J.

ZINC WIRE
THE PLATT BROS. & CO.
Waterbury 20, CONN.

SURFACE COMBUSTION TOLEDO 1, OHIO
Surface
HEAT TREATING EQUIPMENT

TRAUWOOD
Patenting, Annealing, Tempering, Galvanizing, and Tinning equipment for wire.
TRAUWOOD ENGINEERING CO.
Cleveland, Ohio

"PARALAN"
Rust Preventatives
Lubricants
AMERICAN LANOLIN CORP.
Lawrence, Mass.

Immediately Available
WIRE WORKING MACHINERY
FOURSLIDES: Baird, Nilson & Manville, Nos. 0, 1, 2, 3, 4, 5, 3-20, 4-26
U. S. Tool Co. No. 22, 28, & 33 Multislides
Sleeper & Hartley Spring Coilers Nos. 0, 1, 2, 3, 3½, 4, & 5
Vaughn Nos. 8, 10, & 12 Moto-Blocs
Waterbury No. 3 Bull Blocks, Duplex
Morgan 4 stand Wire Drawer with pointer and 100 H.P. motor drive & motor
Waterbury Nos. 1, 2, & 3 Continuous Wire Drawing Machines
PARTIAL STOCK LISTING
"The most diversified stock of machinery in the country. If it's machinery we have it."
National Machinery Exchange
130 Mott St., New York 13, N. Y.
CAnal 6-2470

Chicago Office Changed by Surface Combustion

Surface Combustion Corporation of Toledo, Ohio announces the moving of their Chicago Industrial Furnace Division office from Room 1270, 122 So. Michigan to Park Ridge Federal Bank Building, 116 So. Prospect in Park Ridge, Illinois, effective April 26th.

★ ★ ★

Personnel involved in the change are **W. O. Owen,** District Manager, **H. J. Gregg, C. E. Newman, W. M. Dempster** and **R. Daley**

★ ★ ★

Increased manpower to better serve the Metropolitan Area has made this move to larger quarters necessary.

Opinion vs. Fact In the Wire Industry

(*Continued from page* 640)

charts will indicate trends in a process, such as tool wear, and thus give the machine operator a warning as to when a change is necessary in order to prevent an oversize product from being produced.

★ ★ ★

In addition, through quality control on a process the product from which is being tested by means of a sampling plan, we can calculate process capabilities and can inform engineers whether or not the machine is capable of turning out a product that will consistently meet specifications.

★ ★ ★

I have just given a glimpse of what quality control can do. Remember, the responsibility for quality rests with the foremen, and this new tool is one means of helping him meet this responsibility by better controlling his process level and through the reduction of scrap and re-works. Believe me, this new tool actually works wonders as you are always dealing with facts from the process itself and not the mere opinion of some one who thinks he knows.

New Enameling and Annealing Take-Up Frame

The Woodside Wire Corporation, Greenwood Ave., Wortendyke, N. J. has announced the addition to its line of wire processing machinery of a versatile new enameling take-up frame that can be used also as a take-up for continuous strand annealing furnaces.

★ ★ ★

It was designed particularly for Taylor and Kel-F coating dipping processes, but has other valuable applications. An important feature is its variable speed range ratio of 3 to 1, which permits of wire speeds as low as 3 F.P.M. to as high as 300 F.P.M.

★ ★ ★

Reel shafts operate on ball-bearings. Reel sizes can vary from 4 heads of 6" x 12" with ¼" bore to 8 heads of 3" x 6" with ⅝" bore. Reel arbor bore sizes are optional and can be supplied as specified. The unit will handle wire in sizes running from No. 8 to No. 36 gauge, B & S, and is equipped with a single capstan power take-off and a double capstan power take-up.

★ ★ ★

The company manufactures special machinery for the wire industry, in addition to its line of wire drawing machines, die polishing and lapping machines, tinning units, re-spoolers, fine wire twisting machines and enameling equipment.

★ ★ ★

Complete details on the new take-up or other equipment will be furnished upon request.

There's Nothing Like A **NILSON**
Specializing in Forming Equipment for Over 50 Years.
THE A. H. NILSON MACHINE CO.
1516 Railroad Avenue • Bridgeport 5, Conn.
Automatic Chain Making Machines
Automatic Staple Forming Machines
Wire Straightening Equipment
Wire and Stock Reels • Foot Presses • Slide Feeds for Presses
• CHICAGO • LOS ANGELES
• DETROIT • HAMILTON, ONT
• CLEVELAND , CANADA

FOR SALE
One New HUGHESVILLE Wire Straightening and Cut-Off machine for immediate delivery. Capacities: 3/32" to ¼" diam. wire, 107 to 109 FPM, and will cut up to 60 inch lengths.
HUGHESVILLE MACHINE AND TOOL CO.
HUGHESVILLE, PENNA.

Norbide Abrasive Ideal for Lapping

A leading manufacturer of cemented carbide products points out that the use of carbide dies has increased wire production from 100 to more than 50,000 pounds per day per hole. Many wire mills have discovered that still further savings can be effected by using NORBIDE (boron carbide) abrasive in place of the much more expensive diamond powder for refinishing these carbide wire drawing dies.

★ ★ ★

Although it will not cut as rapidly as diamond powder, NORBIDE abrasive can be used more profusely because of the great differential in cost.

★ ★ ★

This hardest of man-made abrasives is proving outstandingly effective and economical for ripping and semifinishing operations. It is available for immediate delivery and costs far less than diamond powder.

★ ★ ★

Sizes 220 and 240 are recommended for ripping while 320F is the popular size for semifinishing.

★ ★ ★

Many mills have found they can get a satisfactory final finish with NORBIDE abrasive in sizes 500, 600, and 800. To be sure, where the finest possible finish is required, diamond powder is recommended for the final polishing stage.

★ ★ ★

Olive oil, light machine oil, kerosene or mineral oil diluted with kerosene are used as vehicles to retain the NORBIDE abrasive particles in suspension. A half-and-half mixture of cocoanut oil and cottonseed oil has also been used successfully.

★ ★ ★

For further information, please write the Norton Company, Worcester 6, Mass.

SUPERINTENDENT

Midwestern mill has opening for Superintendent with metallurgical and practical operation background. Experience on all finishes of wire required with emphasis on hot dip galvanizing. Please include complete resume of work experience. Write Box 700.

Engineering and Professional Services

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REGISTERED PATENT ATTORNEYS
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●

Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request.

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Schumag Schumacher Metallwerke, Aachen, Germany.

MACHINERY—Chain Making
Cosa Corporation, New York, N. Y.
Nilson, A. H. Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Closing Rope
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh.
American Insulating Mach'y Co., Phila., Pa.
National Mach'y Exch. (Used), New York.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Utica Drop Forge & Tool Corp., Utica, N. Y.
Wean Equipment Corp., Cleveland, Ohio
Wells, Frank L., Co., Kenosha, Wis.

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.
Herborn, Herborn, Germany.

MACHINERY—Diameter Testing Continuous
Standard Electronic Research Corp., New York, N. Y.

MACHINERY—Die Making
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. General Electric Co., Detroit, Mich.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Firth Sterling, Inc., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Nord International Corp., Orange, N. J.
Wayne Wire Die Co., Hillside, N. J.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Electrode Grinding
Cosa Corporation, New York, N. Y.

MACHINERY—Edging (See MACHINERY — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
Rockwell Co., W. S., Fairfield, Conn.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Extruding
Aetna-Standard Engineering Co., Pittsburgh.
Davis-Standard Sales Corp., Mystic, Conn.
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Mettler Machine Tool, Inc., New Haven, Conn.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis-Standard Sales Corp., Mystic, Conn.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Mach. Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia.
Cook Mfg. Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, O.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.
Mummert-Dixon Co., Hanover, Pa.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Baird Machine Co., The Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g Co., Youngstown, Ohio.

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.
Cosa Corporation, New York, N. Y.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.
Wean Equipment Corp., Cleveland, O.

MACHINERY—Re-Spooling
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Mummert-Dixon Co., Hanover, Pa.
National Mach'y Exch. (Used), New York, N. Y.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.
Woodside Wire Corp., Wortendyke, N. J.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Schumag Schumacher Metallwerke, Aachen, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Sales Corp., Mystic, Conn.
Royle, John & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Peschel Electronics, Inc., New Rochelle, N. Y.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
National Mach'y. Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt, Germany.

MACHINERY—Straightening & Cutting
Cosa Corporation, New York, N. Y.
Kilmer, M. D., & Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Medart Co., The, St. Louis, Mo.
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
Maillefer S. A., Renens-Lausanne, Switzerland.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Studmaking
Cosa Corporation, New York, N. Y.

MACHINERY—Swaging
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Sales Corp., Mystic, Conn.
Ets. Pourtier Frères, Romainville, France
Federal Manufacturing Co., Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
New York Engineering Co., Yonkers, N. Y.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Testing Magnet Wire Coatings for Pin Holes
Peschel Electronics, Inc., New Rochelle, N. Y.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.
Spring Mfgs. Supply Co., Plantsville, Conn.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding
(See WELDERS—Butt and Spot)

MACHINERY—Washer Forming
Cosa Corporation, New York, N. Y.

MACHINERY—Winding Wire
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Newark, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Mummert-Dixon Co., Hanover, Pa.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Herborn, Herborn, Germany
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Schumag Schumacher Metallwerke, Aachen, Germany
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn.
Cosa Corporation, New York, N. Y.
Kilmer, M. D., & Co., Cleveland, Ohio
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Wean Equipment Co., Cleveland, Ohio

NAIL TOOLING—Tungsten Carbide
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Brothers, Inc., Cortland, N. Y.

NOZZLES—For Extruding Machines
Wire Tool Div., Bridgeport Jig Boring Co., Bridgeport, Conn.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Rockwell Co., W. S., Fairfield, Conn.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAPER—Creped Wrapping
National Waterproof Papers, Inc., Camden, N. J.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
National Waterproof Papers, Inc., Camden, N. J.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—
(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS
(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Youngstown Welding & Eng'g Co., Youngstown, Ohio

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

PLASTICS—for Wire Insulation
Electronic Rubber Co., Stamford, Conn.

PLIERS—For Wire
Utica Drop Forge & Tool Corp., Utica, N. Y.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRESSES—Hydraulic and Mechanical
Aetna-Standard Engineering Co., Pittsburgh, Pa.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wean Equipment Corp., Cleveland, Ohio

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Fidelity Machine Company, Inc., Philadelphia
Industrial Ovens, Inc., Cleveland, Ohio.
Kilmer, M. D., & Co., Cleveland, Ohio
Moslo Machinery Co., Cleveland, Ohio
New York Engineering Co., Yonkers, N. Y.
Roll-A-Reel, Cincinnati, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.
Nelson Company, The, Baltimore, Md.
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L. Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Ind.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Ind.
Mason Can Company, East Providence, R. I.
McCaskie, Inc., Wm., Westport, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Milton Machine Works, Inc., Milton, Pa.
Moslo Machinery Co., Cleveland, Ohio
Mossberg Pressed Steel Corp., Attleboro, Mass.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Wooden
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
Nelson Company, The, Baltimore, Md.
Winchester Reel Co., Ashuelot, N. H.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
(See OVENS—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Crucible Steel Co. of America, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Steel
Crucible Steel Co. of America, Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
Chase Brass & Copper Co., Waterbury, Conn.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Platt Bros. & Co., The, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Sheffield Steel Corp., Kansas City, Mo.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Blocks
Madesco Tackle Block Co., Easton, Pa.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See COMPOUNDS—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See COMPOUNDS—Rust Preventing)

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
New York Engineering Co., Yonkers, N. Y.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See COMPOUNDS—Wire Drawing)

SODIUM—for Descaling
du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's, John A. Sons Corp., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

STRIPPERS—Wire, Electric
Utica Drop Forge & Tool Corp., Utica, N. Y.

TANKS—Compound
New York Engineering Co., Yonkers, N. Y.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.

TESTERS — INSULATION
(See MACHINERY—Spark Testers)

TESTING EQUIPMENT
(See MACHINERY Testing, Physical and Diameter Testing)

TESTING EQUIPMENT—Springs
Spring Mfgs. Supply Co., Plantsville, Conn.

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc.
(See TINSEL—Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TOOLS—Spring Forming
Spring Mfgs. Supply Co., Plantsville, Conn.

TOOLS—Welding Wire, Strip & Foil (Pressure)
Utica Drop Forge & Tool Corp., Utica, N. Y.

TOOLS—Wire Cutting
Porter, H. K. Inc., Somerville, Mass.
Utica Drop Forge & Tool Corp., Utica, N. Y.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels
Drums & Traverses (See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

TUBE BENDERS AND FORMERS—
Kilmer, M. D., & Co., Cleveland, Ohio

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Hoffman Co., Robt. W., Chicago, Ill.
Micro Products Co., Chicago, Ill.
Utica Drop Forge & Tool Corp., Utica, N. Y.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Malin & Co., The, Cleveland, Ohio
Scovill Mfg. Co., Waterbury, Conn.
Seneca Wire & Manufacturing Co., Fostoria, O.

WIRE—Barbed
Interlocking Fence Co., Morton, Ill.

WIRE—Brass
Chase Brass & Copper Co., Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—Brush
Spencer Wire Corp., Union, N. J.

WIRE—Bunched & Stranded, Copper
Camden Wire Co., Camden, N. Y.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Camden Wire Co., Camden, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind
Crucible Steel Co. of America, Pittsburgh, Pa.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Scovill Mfg. Co., Waterbury, Conn.
Seneca Wire & Manufacturing Co., Fostoria, O.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
Chase Brass & Copper Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—For Electrical Conductors
Camden Wire Co., Camden, N. Y.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.

WIRE—Flat, Fine
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Galvanized
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Roebling's, John A. Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Worcester, Mass.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Keystone Steel & Wire Co., Peoria, Ill.
National Lock Washer Company, The, Newark, N. J.
North American Philips Co., Inc., Elmet Division, Lewiston, Me.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Scovill Mfg. Co., Waterbury, Conn.
Seneca Wire & Manufacturing Co., Fostoria, O.
Sheffield Steel Corp., Kansas City, Mo.
Spencer Wire Corp., Union, N. J.
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., The, Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, O.
Spencer Wire Corp., Union, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Chase Brass & Copper Co., Waterbury, Conn.
Malin & Co., The, Cleveland, Ohio

WIRE—Oil Tempered
Crucible Steel Co. of America, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.

WIRE—Silver Plated Copper
Camden Wire Co., Camden, N. Y.

WIRE—Special Shapes
Crucible Steel Co. of America, Pittsburgh, Pa.
Continental Steel Corp., Kokomo, Ind.
National Lock Washer Company, The, Newark, N. J.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Crucible Steel Co. of America, Pittsburgh, Pa.
Firth Sterling, Inc., Pittsburgh, Pa.
National Lock Washer Company, The, Newark, N. J.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Steel—Also Coppered and Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Sheffield Steel Corp., Kansas City, Mo.
Spencer Wire Corp., Union, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Tinned Copper
Camden Wire Co., Camden, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Elmet Division, Lewiston, Me.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WRAPPING PAPER—Creped
(See PAPER—Creped Wrapping)

YARNS & TAPES—Insulating
Celanese Corporation of America, New York, N. Y.
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.
Libbey-Owens-Ford Glass Co., Fiber Glass Div., Toledo, Ohio.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

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ESTABLISHED 1845

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ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE
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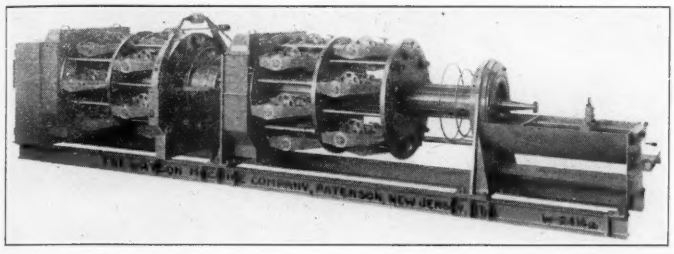
STRANDING HEADS

PATENTS AND PATENTS PENDING

BACKED BY MANY YEARS OF EXPERIENCE AND CONSTANT EFFORT, WE OFFER SUPERIOR MACHINES WHICH MEET ALL REQUIREMENTS, OF WHICH THE FEW SHOWN HERE ARE EXAMPLES.

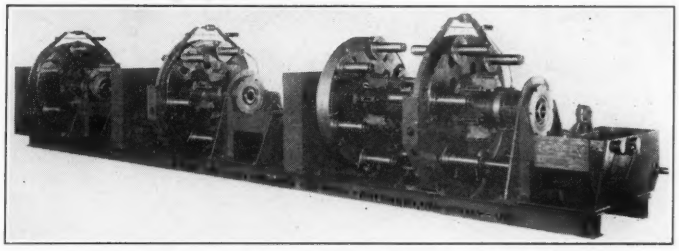


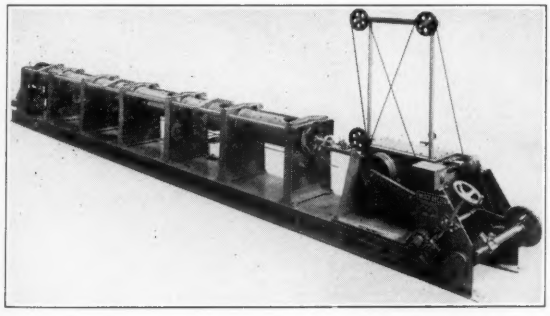
TYPE "PH/GB" SERIES 1500—PLANETARY

No. W-2414a. FOR 24-12" SPOOLS. "SHAFTLESS", INTEGRAL FRICTION, NO-LOOSE-PART CRADLES ELIMINATE SPOOL SLAP. VARIABLE GEARED BACKTURN. FOR HEAVIEST DUTY. COMPLETELY BALL BEARING. AVAILABLE IN 12 SIZES AND COMBINATIONS.

TYPE "RH"—RIGID FRAME

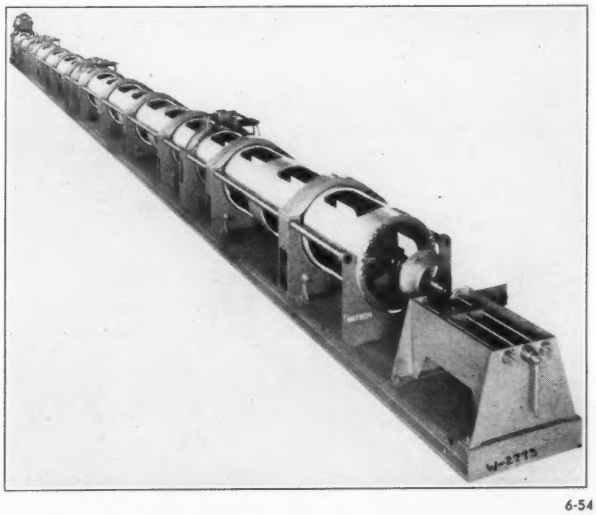
No. W-3933. 6, 12 and 18 SPOOL HEADS FOR 22" SPOOLS. MOUNTED ON COMMON BASE FOR 37 WIRE STRAND PRODUCTION IN ONE PASS AND TO 127 WIRE STRAND PRODUCTION BY MULTI-PASS. PRODUCES ROUND AND SECTOR, COPPER AND ALUMINUM STRANDS AT HIGHEST SPEED AND LOWEST COST. AVAILABLE IN 24 SIZES AND COMBINATIONS.





TYPE "VL"—EXTRA HIGH SPEED—TUBULAR

No. W-4144-46. COMPLETE 12—7" SPOOL MACHINE, 1800 R.P.M. "SHAFTLESS", NO-LOOSE-PART, AUTOMATIC LOCK CRADLES. HIGHEST PRODUCTION RECORDS. SAFE AND QUIET. AVAILABLE IN 24 SIZES AND COMBINATIONS.



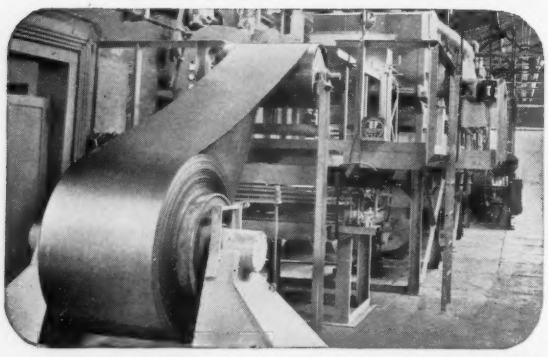
TYPE "TH"—HIGH SPEED—TUBULAR

No. W-2773. 25—22" SPOOL HEAD, 435 R.P.M. SOLID BOX BASE. ONE-HAND SELF-LOCKING BOAT CRADLES. SINGLE SPIDERS. ALL STEEL ROTOR. AUTOMATIC SPRING SET BRAKES. THE INDUSTRY'S STANDARD FOR MANY YEARS. AVAILABLE IN 38 SIZES AND COMBINATIONS.

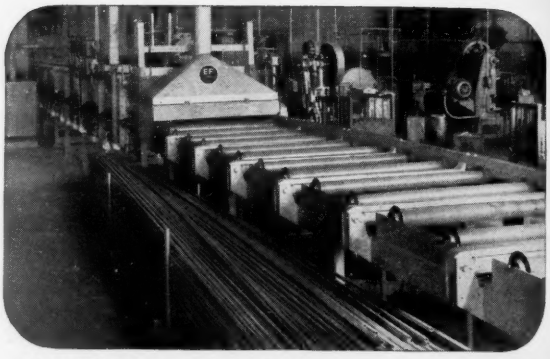
* * *

Descriptive Literature Available on all Head Types and on Capstans, Takeups and Other Auxiliaries.

6-54



EF CONTINUOUS STRIP LINES— for annealing, galvanizing, aluminizing, etc. This combination gas-fired and electric unit provides flexibility in controlled heating, soaking and cooling, for producing various surface and metallurgical conditions on ferrous and nonferrous strip. Built by The Electric Furnace Co., Salem, Ohio.



EF CONTINUOUS FURNACES are built in many sizes and types for processing wire, sheet, castings, stampings, strip, tubing and many other products. This EF gas-fired radiant tube special atmosphere furnace bright normalizes 3000 lbs. steel tubing per hour. Built by The Electric Furnace Co., Salem, Ohio.

EF builds Gas-Fired, Oil-Fired and Electric Furnaces for these and other heat treating operations

● EF engineers specialize in designing and building production furnaces — continuous and batch types — including roller hearth, roller rail, chain belt, wire belt, slot and tube conveyor types, reciprocating, rotary, car, bell, pit and other designs; complete with special atmosphere producers, and time and labor saving material handling equipment as required.

Reflecting more than 30 years of continuous research and experience, and outstanding engineering accomplishments, EF furnaces combine high heating efficiency, accurate automatically controlled cycles, and advanced designs that minimize maintenance, assure economy of operation, high hourly output and uniformity of product.

Submit your production furnace problems to ***experienced engineers — it pays.***

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ALUMINIZING
BRAZING
CARBON RESTORATION
CARBURIZING
CERAMIC DECORATING
DRAWING
GALVANIZING
HARDENING
HOMOGENIZING
MALLEABLIZING
NORMALIZING
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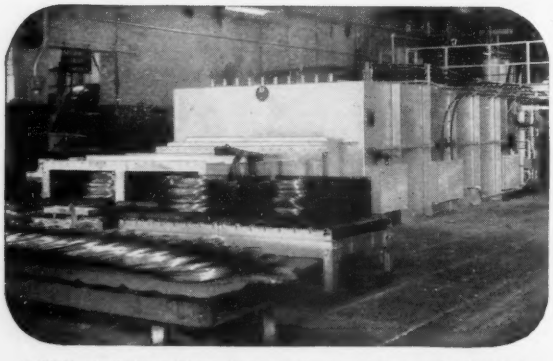
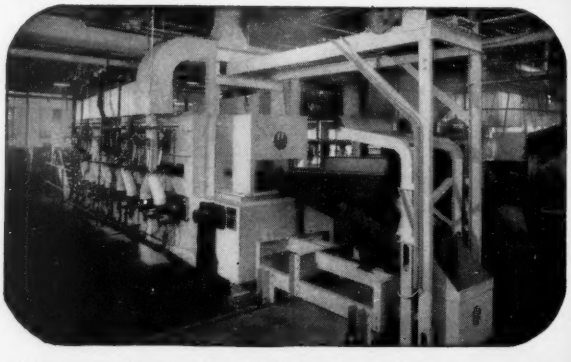


BRIGHT ANNEALING WIRE. An EF continuous bright annealing furnace in which the wire is conveyed through the various zones on two parallel rows of bulkhead type trays. This unit has convection cooling and handles 2500 net lbs. of wire per hour. Built by The Electric Furnace Co., Salem, Ohio.



HARDENING SMALL PARTS—CONTINUOUSLY. EF chain belt conveyor furnaces are unsurpassed for uniform, low cost, scale-free hardening, carbon restoration and non-decarb heat treating. 11 sizes. Capacities from 175 to 2000 lbs. per hour. Built by The Electric Furnace Co., Salem, Ohio.